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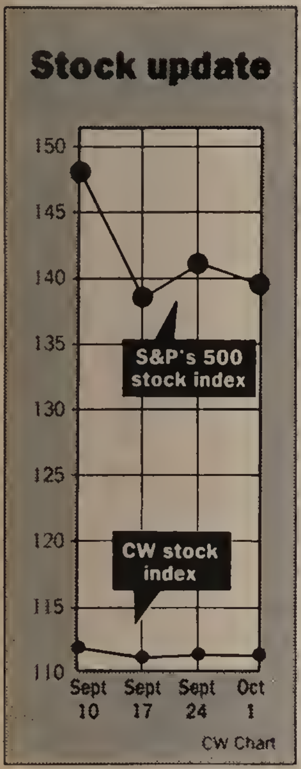

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Large and medium-scale systems/**59**

In Depth
AARP cuts apron strings, brings DP in-house/**101**

TOP OF THE NEWS

Police and the FBI recovered a shipment of stolen DEC computer boards and made an initial arrest in a continuing nationwide investigation of high-tech thievery. **Page 8.**

■

A scientific study reports no danger to pregnant women who use VDTs fewer than 20 hours a week. Results are inconclusive for more intensive users. **Page 12.**

■

Congress nears passage of computer crime bills outlawing electronic mail taps and the posting of computer passwords on electronic bulletin boards. **Page 4.**

■

MCI Communications is planning a dual satellite/fiber-optic network for worldwide telecommunications service. **Page 35.**

■

The long-expected IBM deskside system using 370 architecture will debut this week, according to reports sweeping the industry. Commonly called a "mainframe on a chip," "a Micro370" and "a 4311," the system reportedly will be targeted at the low end of the IBM 4300 market. One consultant said an IBM source told him that the 4311 name was at least a working label and that the multiuser

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Coming this week:

FOCUS

The rapidly changing world of office systems will be analyzed in *Computerworld Focus*, due out Oct. 8. The issue will examine IBM's System/36 and 38 strategy, how minicomputer vendors are integrating PCs into their office systems, the fast-paced desktop publishing market and technologies, the role of IBM's DB2 in the office, what's working for corporate users and what isn't, plus much more.

Mac -VAX link bows

Apple micro will use DEC mini as data base manager

By Douglas Barney

SAN FRANCISCO — Apple Computer, Inc.'s Macintosh microcomputer should receive a boost into the corporate market this week with the expected announcement of a product linking the Mac with VAX minicomputers.

The product will allow the Macintosh to use the Digital Equipment Corp. VAX units to store data while maintaining the Macintosh user interface. It will also provide concurrent access to data stored on the VAX. The multiuser data base, called Helix VMX, is manufactured by Odesta Corp., a small developer of Macintosh software.

See **MAC** page 10

DDS networks add diagnostics

By Elisabeth Horwitt

Users clamoring for diagnostic and network management capabilities on Dataphone Digital Service links will soon be satisfied — at least in some parts of the U.S. — if divested Bell operating company tariffs are approved by the Federal Communications Commission.

This was made clear last week, as several divested Bell operating companies revealed plans to introduce a secondary channel to DDS offerings. AT&T, while making no formal announcement, said that it has been ready for two years to introduce secondary channel support as soon as it was available in enough local access and

See **DDS** page 8

Sperry adds overseas - Is U.S. next?

By Donna Raimondi

A Sperry Corp. division in Tokyo has released a mid-range mainframe computer system that is reported to have the same architecture and functionality as Sperry's top-of-the-line 1100 processor family, but at a significantly lower entry-level cost.

Sperry officials in the U.S. would not comment on the product — the first Sperry mainframe announcement since the Sperry-Burroughs Corp. merger — other than to state that it is part of a much larger group of products being released in the U.S. next week.

Officials of Sperry's Nippon Univac Kaisha, Ltd. told an audience of 650 Japanese computer industry professionals and distributors that the Univac 2200 was designed with the functionality of a high-end mainframe at a cost equal to approximately $250,000. Deliveries are slated for April in Japan. U.S. prices and delivery dates were not available from the vendor at press time.

The middle range is a good target for Sperry at this point, according to analyst Thomas Henkel of The Yankee Group in Boston. While IBM has sewn up the mainframe marketplace, the mid-range market — currently dominated by Digital Equipment Corp. and IBM — has room for a third competitor. Henkel predicted it could be years before IBM has a good enough mid-range strategy to be fierce competition here. In the meantime, while Sperry is at least a year or two behind in development for this marketplace, it has a decent chance of becoming an important presence, he said.

The system's one-board CPU is said to consist of the Sperry 1100 chip set, a combination of seven CMOS chips that integrate a total of 175,000 transistors, or

See **SPERRY** page 6

CW SPECIAL REPORT

Time-sharing: Traditional service adds features, changes roles

By Stanley Gibson

The history of time-sharing during the past few years resembles the fate of some well-known personalities who, having achieved some measure of fame, experience an abrupt and upsetting reversal of fortunes. Like them, time-sharing is now living a new life under another name — or rather, under several new names.

Cropping up to define the new time-sharing identity are such amorphous labels as teleprocessing, network services and information services. While some of time-sharing's evolutionary heirs, such as Electronic Data Interchange, are essentially shared networks, there is still a market, albeit a shrinking one, for time-sharing in its classical definition — the purchase of remote computing power.

Dave Nisenson, senior engineer for Virginia Power based in Richmond, Va., employs time-sharing in a way that is typical of today's user. He utilizes less of it than he once did, purchases time on a powerful mainframe and augments personal computer versatility with remote computing power.

Nisenson uses Control Data Corp.'s Cybernet Express piping and structural analysis programs to test replacement parts for Virginia Power's nuclear power plants. Engineers at Virginia Power use their PCs to design new parts for their plants and then test those designs on a CDC Cyber 176 mainframe.

Dave Nisenson

To fight industry decline, time-sharing providers like CDC have had to tailor generalized programs to fit applications as specific as Nisenson's.

They have also had to adapt the programs to work with, rather than compete against, PCs. And increasingly, they are offering time-sharing on supercomputers — machines that are still too expensive for many users to own.

Despite these efforts, a study by New-

See **TIME-SHARING** page 179

NEWSPAPER

Users find software critical in corporate report control

By Donna Raimondi

Printed reports, a staple in every firm, reach their readers faster in companies using report distribution software.

At Blue Cross/Blue Shield of Massachusetts in Boston, hundreds of reports are distributed among the more than 6,000 employees. Although printing there has always been a centralized activity, project manager John Kolstad is directing the company toward distributed printing. This will eventually include sending IBM mainframe-generated reports directly to laser printers that serve departmental personal computers in remote offices.

Blue Cross/Blue Shield is about halfway through converting its manual distribution system to one controlled by Mobius Software, Inc.'s Infopac report distribution system. At present, most reports are still loaded into tubs for a van ride to two regional offices. But when Infopac is fully operational, reports will print simultaneously on the central data center's three IBM 3800 Model 3 laser printers, the regional office's two Datagraphixs, Inc. 4800 laser printers and planned IBM departmental PC laser printers, Kolstad says.

A similar conversion has already taken place at nearby Dennison Manufacturing Co. in Framingham, Mass. "A few months ago, our 4,000-page general ledger report was printed six times on four-part paper, for a grand total of 96,000 pieces of paper. That report has been reduced to 45,000 pages, and in the process, the distribution time of the report decreased from two or three days to one day," says Gary Kelley, manager of business services. Kelley purchased Computer Associates International, Inc.'s CA-Dispatch report distribution system to help him control daily, monthly and annual reports.

Reports at Dennison are generated in an IBM 3090 Model 180 mainframe and are printed out on two Xerox Corp. 4060 electronic printers, a Sand Technology Systems, Inc. SP1250 1,250 line/min. device and a Sand SP2000 2,000 line/min. printer.

For Thomas Mauss, systems officer at Crocker National Bank — which recently merged with Wells Fargo Bank N.A. — streamlining report distribution is old business with a new twist. Mauss has worked with Mobius's Infopac package for 2½ years. Crocker was just starting to implement distributed printing when the bank was purchased by Wells Fargo. The printing project, along with many others, is on hold until the two banks have finished converging computing resources.

But in the 2½ years of use, The software helped Mauss's group develop a sophisticated report distribution scheme that allows on-line viewing, printing on demand and selective printing of report sections for users who do not need the whole report. A survey conducted last year indicated that $80,000 had been saved on report distribution since the system was installed, Mauss says.

Users of the Infopac and CA-Dispatch report distribution systems, both of which run under IBM operating systems, tell the software how many reports to print, which printer — remote or local — to use, how many sections of reports to print, who in a department receives the reports, how many copies they get and where the finished reports should be sent. In addition, the software creates control sheets that show an overall picture of which departments and cost centers get which reports. It also prints out individual departmental and cost center control sheets to inform the manager there of which reports the department receives and who gets them.

At Dennison, 90% of printing is centralized, Kelley says. Before installing the software, reports had to be decollated (carbons removed), burst (pages separated) and sent to clerks who would spend a couple of days sending them out. MIS now saves eight hours a month in overtime, just for the general ledger, for the decollating and bursting process, and two days in distribution time.

"Before, there was quite a bit of waste, too" Kelley says. If somebody needed one section of a report, the whole report would have to be printed and then cut up.

Improving the printing process does not necessarily mean printing less often, Kelley warns. "We were printing 24,000 pages of our general ledger report before because it was on four-part paper. We print 45,000 single sheets now."

The bulk of Crocker's $80,000 savings resulted from eliminating reprints and being able to control who gets reports. "We offered to put the reports out in the CICS data base and let users view it. Then they could print it only if they wanted it," Mauss says. Crocker devised a process in which users have to go through a control clerk to get the copies, which further discourages paper consumption.

"There is no free lunch, however," Mauss says. "If you want to take a report and break it out down to the page level, rebundle it and present it to the user in a good quality package, that is going to cost some cycles." One report he processed through Infopac was six million pages long. It took an hour of Infopac time and almost 12 hours of print time, he says.

> ***'Keep track of the dead people,' says Gary Kelley of Dennison Manufacturing Co. Kelley's department conducted a survey to track who receives reports and found that about 10% of the recipients were dead or had left the company.***

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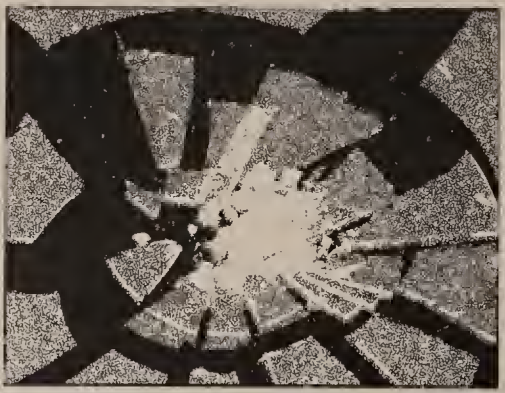

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HARDWARE ROUNDUP

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PAGE 17 ILLUSTRATION BY ALAN WITSCHONKE

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Federal Express cancels Zapmail service

Low demand, high costs doom product

By Stanley Gibson

MEMPHIS — Federal Express Corp. will shut down its Zapmail service, the company announced last week. Speaking to shareholders at the firm's annual meeting, Chief Executive Officer Frederick Smith cited a variety of factors, including weak demand, difficulty in providing high-quality service, increased costs and anticipated losses.

"We found that this market was much harder to stimulate than the research had indicated," Smith told shareholders, adding, "The project would require several hundred million dollars' more investment in customer premises equipment and network capital."

The move will cause Federal Express an after-tax loss of $190 million, the company said.

Although Zapmail pick-up and delivery services will end in mid-November, customers who currently have Zapmailers will be able to purchase the machines and Group 3 facsimile conversion kits for $1,500 until Feb. 1, 1987. Additional Zapmailers may be purchased for $4,900 per machine, including a conversion kit, a spokesman said.

Federal Express had built an extensive satellite network based on Tandem Computers, Inc. computers for Zapmail transmissions and was in the process of adding Digital Equipment Corp. VAX computers to the network, under the design of M/A-Com, Inc. Sources said the Tandem-based Zapmail network will be dismantled, but the DEC-based system will continue to be built. Difficulties in providing network management for the Tandem network contributed to problems in running the system, sources indicated.

Smith said Federal Express hopes "to offer in the future a digital transmission service utilizing small earth stations, our telehub and advanced satellites. Customers will be able to use office terminals and office equipment of their own choosing to access the network," he said.

But unlike the Zapmail network, Federal Express will not build the network in advance of the traffic, according to Smith. Instead, transmission services will be provided to users who have a demonstrated requirement to improve their internal data networks for both interactive transactions and high-speed copy transmissions, Smith said.

Smith listed other factors that contributed to Zapmail's demise:

- The network of leased telephone lines, computer switches and satellite links could not be operated with satisfactory reliability. He pointed to local telephone connections in particular that "could not move the large data streams required for volume copy transmissions at acceptable speeds and costs."
- It was once thought that the cost of Zapmailers would go down every year. But the recent yen-dollar exchange rate made it impossible for NEC Corp., the maker of Zapmailers, to reduce prices on the machines.
- The U.S. space shuttle disaster caused a 50% jump in the cost of launching satellites. Because of that and other launch failures, the cost of insurance has quadrupled.
- The cost of new and used aircraft for the express system has increased.
- New, low-cost facsimile machines have come onto the market in the last year, offering Zapmail stiff competition.

Andrew Clark, a consultant with Houston-based Walter Ulrich Consulting, said Federal Express "offered a Rolls Royce product when the market required much less."

"The other question is whether Federal Express really knows what it wants to do," Clark said. "The company recently told analysts that they were 'in Zapmail to make it work.' Someone at the top must have decided to cash in the chips. The move was very sudden."

Congress OK nears on computer crime bills

By Mitch Betts

WASHINGTON, D.C. — The U.S. Congress, capping several years of work on computer security and privacy issues, last week took strides toward final approval of two major bills that legally protect computer files and data transmissions from hackers, industrial spies and other marauders.

Once the bills are signed into law by President Reagan in the next few days, it will be a federal crime for trespassers to observe or alter data stored in a computer located in another state, to intercept electronic mail or electronic funds transfers or to distribute stolen passwords for criminal purposes.

DP managers said the congressional action is long overdue.

"We need some legislation to cover interstate crimes and define federal jurisdiction," said Joseph E. Collins, governmental affairs manager for the Data Processing Management Association.

The Computer Fraud and Abuse Act of 1986, a bill aimed at interstate computer crimes, was passed by the Senate last week, and the House of Representatives is expected to approve the Senate version early this week before Congress adjourns. The Electronic Communications Privacy Act, which protects the privacy of data communications, was approved by both the Senate and the House last week and awaits the president's signature.

The Computer Fraud and Abuse Act applies to computers used by the federal government and federally insured financial institutions, as well as all interstate computer crimes [CW, April 28].

The legislation makes it a federal misdemeanor to trespass intentionally in a computer to observe or obtain data. It also becomes a felony to access a computer for a theft-by-computer scheme or to alter or destroy computer data if $1,000 worth of damage is done or the files are medical records.

Pirate bulletin boards

The bill also makes it illegal for pirate bulletin boards to traffic in stolen computer passwords with intent to defraud, if the trafficking affects interstate or foreign commerce or a U.S. government computer.

The Electronic Communications Privacy Act legally prohibits private citizens from intercepting data communications without authorization and requires government agents to obtain a court order to get access to electronic communications [CW, June 16].

"Both of those protections will be terribly important in providing the user of data communications, electronic mail in particular, the assurance that his data transmission will be given the same level of privacy protection accorded the older technologies of voice telecommunications and postal mail," said Philip M. Walker, vice-president and regulatory counsel for Telenet Communications Corp. in Reston, Va.

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New Dimensions in Software Productivity.

TOP faces SNA, user apathy in struggle to become standard

Protocol lacks identity, support

By Rosemary Hamilton

The future of the Technical Office Protocol (TOP), a user-proposed standard for office networking, is much less certain than that of its counterpart, the widely supported Manufacturing Automation Protocol (MAP). For TOP, which celebrates its first anniversary next month, there are still a number of challenges, including competition from IBM's Systems Network Architecture (SNA) and a lack of user recognition, before it can enjoy the success that MAP is almost assured of having.

"The only light I see at the end of the tunnel is TOP or a TOP-like solution," says Wayne Edwards, a TOP Executive Committee member of the MAP/TOP User Group and project manager of information resource management at McDonnell Douglas Corp. in St. Louis. "There is a danger that it won't catch on. And as users, that means we'd be no worse off than we are today — which is a mess."

Among a list of many challenges, there are three major issues facing TOP supporters:

- Unlike MAP, TOP is slated to become the networking standard in an arena where a few major vendors' proprietary networking solutions — most notably IBM and its SNA — are firmly entrenched.
- The process to establish specifications for TOP has become more complex than the MAP process because it involves many office automation functions that MAP does not need. As a result, users and vendors have adopted a wait-and-see approach while many TOP technical issues remain unresolved.
- TOP lacks a clear-cut identity. While the TOP effort could be greatly benefited by support from major industry segments like banking and insurance, it remains closely tied to the manufacturing community.

"There are still a lot of things going on. It's too early to tell the future of TOP," says Andrew Clark, a consultant with Walter Ulrich Consulting, a subsidiary of Coopers & Lybrand.

But representatives from Boeing Co., the chief initiator of TOP, point out that, being officially less than a year old, TOP cannot be expected to have the widespread support that MAP has gathered during the past three years.

> ***'If IBM came out tomorrow and embraced TOP, it would become the de facto standard overnight. But I don't see that happening, because TOP has to compete with other standards.'***
>
> **— Andrew Clark**
> **Walter Ulrich Consulting**

"We're pleased with its development, especially given that TOP started from scratch a year ago," says Les Kerr, manager of Open Systems Interconnect consulting at Boeing.

Analysts suggest that a key factor to TOP's success would be a commitment from IBM. "If IBM came out tomorrow and embraced TOP, it would become the de facto standard overnight," says Clark of Walter Ulrich Consulting. "But I don't see that happening, because TOP has to compete with other standards."

Stiff competition

Robert Payne, a senior specialist of the information systems department at Du Pont Co., agrees with Clark. "It's competing against an embedded base of DEC and IBM," he says. Payne also serves on the TOP Executive Committee.

Referring to the success of the manufacturing protocol, he says, "MAP didn't move into an area dominated by one or two big vendors."

"It certainly is a reality that we have vendors who have a stronger presence than MAP had to deal with," says James Converse, who is also a member of the TOP Executive Committee and serves as the coordinator of TOP activities at Eastman Kodak Co. "We're up against proprietary networks that vendors are still pushing."

With roots running back to 1983, TOP made its public debut in November 1985. The purpose of TOP is to improve office productivity by using a nonproprietary network that would accommodate office systems from a variety of vendors.

TOP, like MAP, is based on the International Standards Organization's Open Systems Interconnect reference model for networking protocols. It consists of seven protocol layers, each governing a particular aspect of networking. TOP and MAP differ in the type of physical cabling used, which is represented by Layer 1 on the reference model. And, since TOP was designed for the office environment, it also differs from MAP at the uppermost applications layer, which covers OA functions.

In November 1985, IBM issued a statement supporting the "concept of open systems" and said, "As the definition of TOP evolves, we will continue to appraise our participation in it." Since that time, IBM has been actively involved with the MAP movement and announced a number of MAP-related products last month, but there have been no additional statements regarding TOP, an IBM spokeswoman said.

But beyond IBM, there are still many users and vendors that hesitate to embrace TOP. Because a number of technical issues have yet to be finalized, few user pilot projects have been launched. Likewise, there have been only a handful of TOP products introduced. Both factors further hinder the efforts to gain new supporters.

"The problem is that TOP was the second one to come around. Our major concern is a business one. We want to wait and see if TOP is really going to catch on," says Stephen Hagan, manager of automation engineering at NCR Corp.'s manufacturing facility in Wichita, Kan.

In fact, at least three corporations that are represented on the TOP Executive Committee — McDonnell Douglas, Eastman Kodak and Du Pont — have yet to commit to a TOP pilot project.

"It's safe to say it's clearly our intension, but we have no TOP pilot at this time," says Converse, TOP Executive Committee member from Eastman Kodak.

A draft of the new TOP specifications should be released early next year. The follow-up to TOP 1.0, it will be designated TOP 3.0 to correspond with the next release of the manufacturing specification, MAP 3.0. The new version of TOP is expected to include specifications for such functions as electronic mail, document interchange and graphics data storage and transmission.

"I think we're sound enough now to build products on, but most vendors will prefer to focus on Version 3," said Laurie Bride, manager of Boeing's advanced data communications technology department, at the MAP/TOP User Group meeting held last month.

In addition to fostering more support from users and vendors associated with the MAP/TOP User Group, TOP Executive Committee members acknowledge the need for outside support.

Edwards of McDonnell Douglas says the initial alliance with the MAP community "allowed us a springboard to get interest going, but now we have to work at the image we have of an association with manufacturing firms only."

"TOP is always said in the same breath as MAP," says Clark of Walter Ulrich Consulting. It's got to move beyond the manufacturing community. It is perceived as something for airplane manufacturers, and MAP is for car makers. That's fine for the MAP movement, but not for TOP."

Committee proposes 80386 bus standards

By David Bright

WOBURN, Mass. — Should the standard for Intel Corp. 80386-based systems be set by the marketplace or by decree? That issue was raised at the Buscon show here last week when a committee sponsored by IBM Personal Computer-compatible read-only memory BIOS supplier Phoenix Technologies, Ltd. released its preliminary proposal for a 32-bit microprocessor bus standard.

While the committee hopes that its bus specification will ultimately speed the development of 80386-based systems, hardware designers may not begin using the bus until at least mid-1987. By that time, IBM is expected by many analysts to have introduced an 80386-based PC. Further, Compaq Computer Corp.'s recently announced Deskpro 386 system also has a chance of setting the standard.

The committee, known as Personal Computer Extended Technology (PCET), was formed last April to define a standard, 16-bit IBM Personal Computer AT-compatible bus with a 32-bit bus extension. The design accommodates systems built around Motorola, Inc. and National Semiconductor Corp. 32-bit microprocessors as well as the 80386, according to PCET.

In addition to fostering higher performance systems, the design is also intended to make controllers for more powerful peripherals available to PC users. "It will help manufacturers bring these products to market more quickly," said cochairman Ira Perlow, an engineer at Phoenix.

Members of the steering committee include engineers from AT&T, Bull Micral of America, Emulex Corp. Quadram Corp., Olivetti Corp. and Chips & Technologies. Others that have "expressed interest" in PCET include Data General Corp., Digital Equipment Corp. and Intel Corp.

While it works to perfect its proposal, PCET is for the most part gambling that IBM will not bring out its own 80386-based system. But committee chairman Carl Warren, western editor of *Mini-Micro Systems*, and other members maintained that IBM will not use the 80386 as the basis for a PC. Instead, IBM may use the chip as an an I/O processor for an upgraded RT PC system, Warren said.

Meanwhile, rumors persist that IBM has obtained 80386 production masks from Intel and is preparing to custom-manufacture the chip for its PCs. That would make it difficult for other vendors to copy IBM's new system. An Intel spokeswoman reported that IBM has had manufacturing rights to the 80386 for the past year and holds similar rights to the 80286.

Sperry releases machine in Tokyo

From page 1

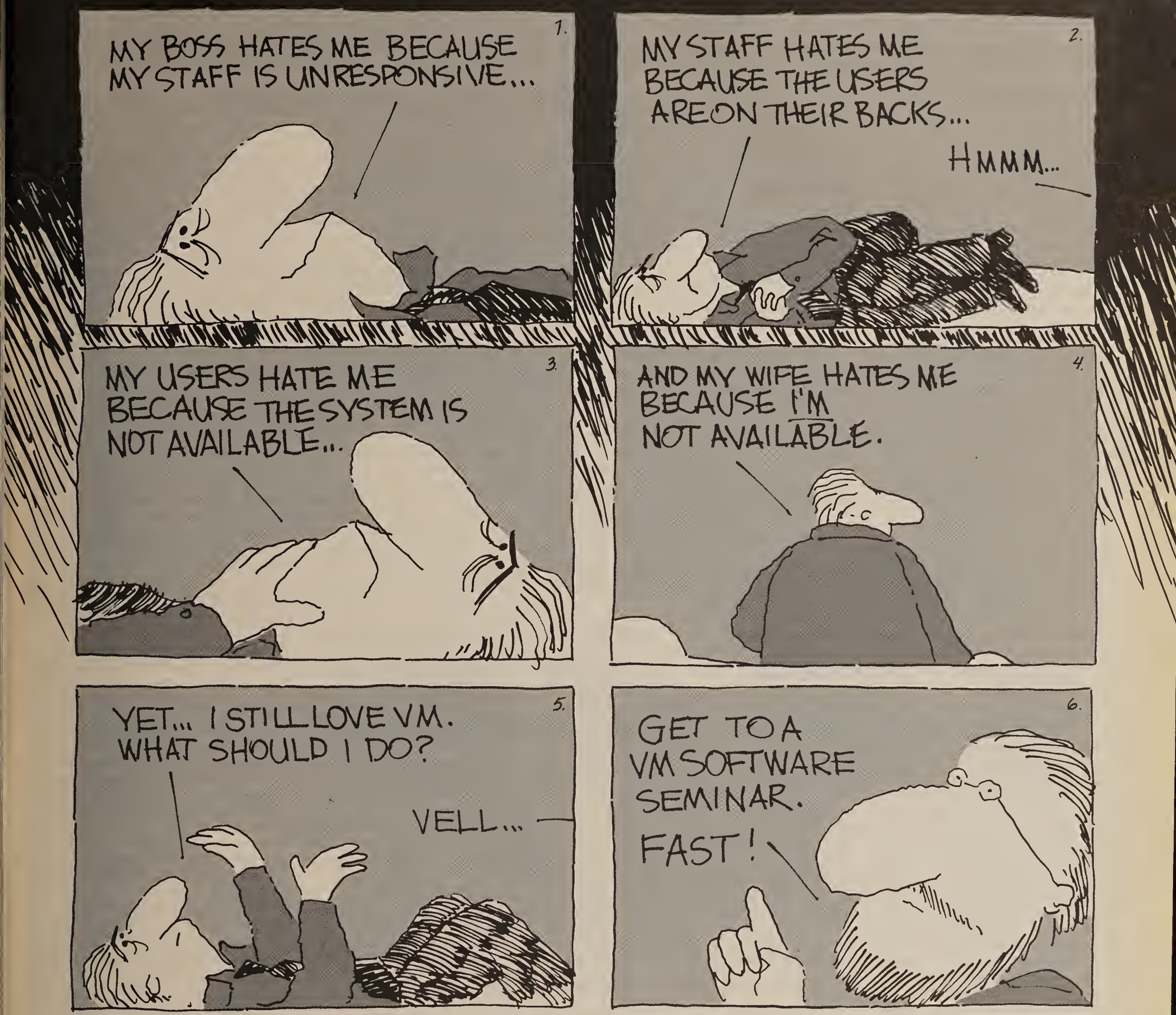
about 34,000 gates. As a result, the officials in Japan said, power consumption has been slashed to one-tenth of that in corresponding models that use bipolar chips.

Main memory is said to range from 24M to 48M bytes, and the system is available in one- to four-processor models.

The system runs Sperry's Mapper fourth-generation language and includes a Mapper tool kit designed to simplify Mapper-based systems development and maintenance. NUK also introduced a three-stage bus that is said to simplify system upgrading.

Takehisa Kondoh of CW Communications International News Service's Asian bureau contributed to this report.

THE VM SYSTEM DAILY DILEMMA *by MR. DATA CENTER PROFESSIONAL*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12:30 p.m.	Complimentary Lunch

Seminar dates and locations

Boston, MA October 23
Chicago, IL October 9
Cincinnati, OH October 10
Cleveland, OH October 7
Columbus, OH October 6
Dallas, TX October 15
Detroit, MI October 8
Edmonton, AB November 12
Hanover, NJ October 22
Houston, TX October 16
Los Angeles, CA September 30
Montreal, PQ October 30
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San Jose, CA October 1
Seattle, WA November 13
Toronto, ON October 28
Washington, DC November 7
White Plains, NY October 20

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Secondary DDS channel on tap

From page 1

transport areas (LATA).

Dataphone Digital Services (DDS) supports digital transmissions at up to 56K bit/sec. over dial-up lines. The channel can carry diagnostic data, network usage information or "just about anything that would add overhead" to a regular DDS channel, noted Gabriel Kasperek, president of Park Ridge, Ill., consulting firm Kazcom, Inc.

Communications managers and vendors alike have been waiting anxiously for the divested carriers to introduce secondary channel offerings, Kasperek noted. "With dedicated analog lines, modems perform diagnostics over a sideband. Although digital DDS services are intrinsically more reliable than analog, users still want the ability to provide traffic monitoring, centralized management, accounting and chargeback and so on."

Business customers for whom network reliability is a major concern are beginning to put pressure on regional telephone companies that have not yet committed to secondary channel support. For example, Niagara Mohawk Power Corp. was disappointed to learn that New York Telephone Co. has no immediate plans to offer such a service.

A consultant had recommended that the Syracuse, N.Y., power company use the secondary channel to monitor two 56K bit/sec. DDS links between its regional center and power control center. Niagara Mohawk has installed a third link as a backup but needs an additional channel to monitor the network for failures.

Now that the secondary channel option has been eliminated, at least for now, the company is investigating other options, such as setting up a separate monitoring circuit.

New York Telephone is currently field-testing DDS with a secondary channel but says it has not made a decision about offering the service.

Some customers, unwilling to wait for the introduction of secondary channel support for DDS, have gone ahead and chosen other networking options. Southeast Bank, N.A. is one such company. The Miami-based bank chose a modem-based analog network some years ago because the network offered diagnostic capabilities that DDS lacked, according to Assistant Vice-President of data network services Mary Ann Anastasia.

The bank nevertheless agreed to participate in a test run of Southern Bell Telephone and Telegraph Co.'s secondary channel implementation. During the trial, two host sites of Southeast Bank's credit division performed batch data transfer over a DDS secondary channel. The transfer was made by DDS interface units, which do not have diagnostics capabilities,from Amdahl Corp.'s Amdahl Communications Systems Division.

The bank is considering DDS as a future option, assuming the availability of both a secondary channel and DDS interface equipment providing diagnostics, Anastasia said.

"What the secondary channel gives users is some of the hands-on control they are demanding," said AT&T Communications, Inc. spokesman Jim Byrnes. AT&T published secondary channel specifications before the divestiture and has been waiting for two years to offer them on DDS, he added.

The local carriers have been dragging their feet about implementing the channel, according to Byrnes. "Before divestiture, we could have told them to do it; but after divestiture, they took a hard squint at the bottom line and said, 'Not me, fellows, not now.' That's the way the post-divestiture world works."

Since the major application of the secondary channel is end-to-end diagnostics, the long-distance carrier has been unable to introduce its own offering until secondary channel support is extended to the end user through the regional Bells' lines.

It may take some time for this to happen, according to Robert Lawrence, Bell Communications Research Corp. (Bellcore) district manager of customer network management services. Many of the regional holding companies are still evaluating whether various operational factors make it worthwhile to initiate secondary channel support, he added.

Acting on a joint request from the regional holding companies, Bellcore last fall published a technical reference on interfacing central office facilities with customer premises and long-distance carriers.

At least three of the seven regional holding companies have announced definite plans to file tariffs for DDS with secondary channel offerings. Last week, Bell South Corp. filed tariffs that, if approved by the FCC, will provide access to inter-LATA DDS services with secondary channels.

Divested Bell operating company Southern Bell already has filed intra-LATA tariffs for Florida and Alabama with the Public Utilities Commission (PUC) and plans to file for the other states in its region by year's end, a Bell South spokesman said.

Pacific Bell has already filed a tariff for intra-LATA DDS with a secondary channel offering and is currently awaiting PUC approval. The company plans to file tariffs for both interstate and inter-LATA services by about Oct. 15. The company hopes to be able to offer the services by Dec. 15.

Bell Atlantic Corp. plans to file inter-LATA, its secondary channel offering, in the first half of 1987. Individual states have not yet set schedules for intra-LATA tariff filings, a company spokesman said.

Another sign of progress is the appearance of DDS interfaces that offer secondary channel support. Teleprocessing Products, Inc. of Simi Valley, Calif., and Racal-Milgo of Sunrise, Fla. — a division of Racal Data Communications, Inc. — recently introduced diagnostic service units that interface their network management systems with DDS networks that support secondary channels.

Datatel, Inc. offers a similar product, and AT&T Information Systems, Inc. should soon come out with a DDS version of the Dataphone II Bell modem, which performs diagnostics over a side channel, a user reported.

"A lot of our customers have requested diagnostics on DDS," said Paul Baxter, Racal-Milgo digital access product manager. "Without secondary channel support, we couldn't use our own network management system on DDS. Now our users can use the same system to manage a hybrid network of digital and dedicated analog lines."

Shipping snafu leads to arrest in VAX board theft case

By Ninamary Buba Maginnis

COLUMBUS, Ohio — A breakthrough was made in the nationwide epidemic of Digital Equipment Corp. hardware thefts last week due to an express mail delivery error.

A Columbus man has been apprehended and a shipment of stolen boards recovered, according to the Columbus Federal Bureau of Investigation and records from Ohio's Franklin County Court House.

Philip James Smith was arrested last week in connection with an earlier Ohio State University (OSU) theft of VAX printed-circuit boards valued at $600,000, according to an affidavit filed at the court house. Smith is charged with interstate transportation of stolen goods valued in excess of $5,000, a federal offense, according to FBI Supervisor Dave Cassens of the Columbus bureau.

The OSU Police Department has charged Smith with possession of stolen property, a third-degree felony punishable by a maximum sentence of 10 years and/or a $5,000 fine, said university police Capt. Richard Harp. Columbus police will also charge Smith with possession of stolen property, according to Detective Robert Snyder.

Smith, who was operating a business called the Columbus Computer Group from his home, has an arrest record with the Columbus Police Department, according to an affidavit filed by the FBI.

Smith, a former computer technician, previously worked for Alpha II Systems, Inc. of Whitehall, Ohio, but terminated his employment there two months before Alpha II suffered a $70,000 theft of DEC equipment in July, the FBI affidavit says.

"The investigation is continuing, and it is entirely possible that there will be additional charges or additional persons will be charged," the FBI's Cassens said.

A second search warrant was issued to FBI agents based on evidence collected at Smith's residence, according to Snyder. Authorities searched Smith's rented space at a Columbus storage company and recovered DEC computer boards valued at $1,000 to $9,000 each, Snyder said. Preliminary discoveries indicated evidence of other thefts, he said, but the case is still under investigation.

Federal and local authorities said they investigated a lead from Paul Ruzinsky, a manager at DEC's Columbus office, who told police a package delivered by Federal Express Corp. addressed to a Danvers, Mass., computer reseller was delivered to the Columbus DEC office by mistake.

The package contained five Microvax II computer boards valued by DEC at $45,000, according to an affidavit filed at the Franklin County Court House. Aided by DEC officials, authorities ascertained that the serial numbers from the Microvax II boards matched those reported stolen from OSU's College of Engineering, the affidavit says.

The package was addressed to Meadowlark Enterprises, Inc., a Danvers, Mass., computer reseller, but appeared to have originated at the Columbus DEC office, the report said. According to the affidavit, an invoice for $37,500 was found in the express mail package with "Columbus Computer Group" inscribed in the heading.

According to the report, Ruzinsky informed officials that an employee of Columbus Computer Group telephoned regional DEC offices looking for the five Microvax II printed-circuit boards.

FBI officials seized circuit boards, computer-related equipment and records pertaining to the seized equipment, according to Boston FBI media agent John Cloherty.

Wang revamps marketing setup

By Eddy Goldberg

CAMBRIDGE, Mass. — IBM, as part of its effort to broaden the use of artificial intelligence in mainstream computing environments, last week opened the IBM Knowledge-Based Systems Center in Cambridge, the heart of "AI Alley."

The purpose of the center is to provide support to new and existing users of IBM's Expert System Environment (ESE) application development shell, according to Victor Goldberg, vice-president and assistant group executive for market development in IBM's Information Systems Group.

The center's activities will include assisting ESE customers with problem selection, system prototyping and providing a hot line and technical bulletins containing techniques and tips for using ESE. The center also will provide technical support for IBM field personnel.

"The real mission here is to get successful AI into production," said Herbert Schorr, who heads up IBM's AI efforts. He said IBM's focus is on smaller, immediately solvable problems with a clear payoff.

The Cambridge center is presently staffed by 25 employees, whose responsibilities range from marketing to technology. IBM's Cambridge Scientific Center, where some AI research is taking place, is within walking distance.

A sister center will be opened on the West Coast by year's end in the Palo Alto/Menlo Park, Calif., area of Silicon Valley.

"The hallmark of the center is that we will customize whatever we do to the customer's unique problems," Sweeney said.

IBM is expected to announce this week a knowledge-based system package that will include support and use of the center.

Artificial intelligence and knowledge-based systems will have a tremendous impact on business, according to Goldberg. The industry is on the threshold of combining knowledge and data in integrated systems, and IBM is in a good position to merge knowledge bases with those existing data bases, he added.

TOP OF THE NEWS

NEWS from page 1
system will use the Micro370 chip that IBM researchers described at a technical conference in February. The consultant also said the system will run IBM's VM.

■

AT&T last week cut the prices of its PC 6300 Plus series of computers from 24% to 30%, depending on the model. The new suggested retail prices range from $3,025 to $3,775. Two days earlier, NCR Corp. cut the prices of its PC4 line of machines from 26% to 47%, depending on the model. Prices now range from $1,865 to $3,430.

And ITT Information Systems last week announced a $2,499 IBM Personal Computer AT-compatible that includes a built-in Enhanced Graphics Adapter, Color Graphics Adapter and monochrome display capabilities.

■

The Oracle relational data base management system will be available on the Wang Laboratories VX series of minicomputers in the first quarter of 1987, Wang officials say. Oracle doubled its revenues with its SQL-based DBMS last year and is projected to do so again this year, to $115 million.

■

Data General is offering a DG/RDOS operating system that allows its DG/RDOS customer base to migrate to the 32-bit Eclipse MV/2000 Departmental Computer. The version is compatible with the 16-bit Eclipse series and the DG Desktop Generation and offers a high level of compatibility with DG/RDOS or mapped Eclipse RDOS languages.

■

As expected, Digidyne Corp. late last week filed for damages of more than $100 million in its 9-year-old lawsuit against Data General.

Last month, DG agreed to pay a $52.5 million settlement to Fairchild Semiconductor in the same software bundling case. A trial to determine damages to Digidyne is scheduled for early 1987 in San Francisco.

■

Ashton-Tate last week appointed Luther Nussbaum as president and chief operating officer. Former Ashton-Tate president Edward J. Esber will retain his positions of chairman and chief executive officer. Nussbaum was formerly a senior executive for Businessland, Inc.

Separately, Ashton-Tate, citing job duplication, said it will cut the staff of newly acquired Decision Resources by 25%. The cuts will affect approximately 35 employees in shipping, production, sales, telemarketing and administration at the Westport, Conn., graphics software unit.

■

In an effort to get out of bankruptcy, a Nashua, N.H., banking software firm has signed three agreements with the information services unit of a major Texas bank.

Houston-based Texas Commerce Information Systems (TCIS), a subsidiary of Texas Commerce Bancshares, has agreed to distribute the products and support the customers of BKW Systems, which filed for Chapter 11 protection June 25. TCIS will also develop an IBM 4300 version of BKW's systems for small and medium-size banks, which currently run on Wang hardware. The agreements are subject to creditors' and bankruptcy court approval.

■

IBM is expected to announce a new version of its VM operating system, called VM/SP 5.0, Tuesday. The system will allow multiple VM systems to be used as a single-image system in the same fashion as existing multiple MVS systems.

Assembly ills stall IBM intro

By James Connolly

One of the first attempts to automate loading and unloading of IBM's 3480 cartridge tape drive has been stalled by what IBM calls assembly problems.

IBM originally planned to deliver the first 3480 Automatic Cartridge Loaders in August with field upgrades being available during September. However, IBM missed those delivery dates and has pushed back delivery of the field-attachable versions until Jan. 30, 1987. Autoloaders attached to 3480s in the factory began shipments Sept. 5, slightly later than scheduled.

An IBM spokesman said problems with the field-installed autoloaders developed at early-user installations, leading to the decision to redesign the product.

"What we found was that the load and unload performance was unsatisfactory from our point of view," the spokesman said, adding that IBM is implementing engineering changes in the product.

The delays came to light after officials in several user companies reported that IBM has put off deliveries and, in at least one case, suggested, through a sales representative, that the user postpone placing an order until the autoloader is ready for shipment. The IBM spokesman said affected customers have been notified of the delay.

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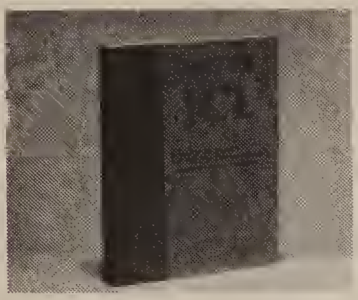

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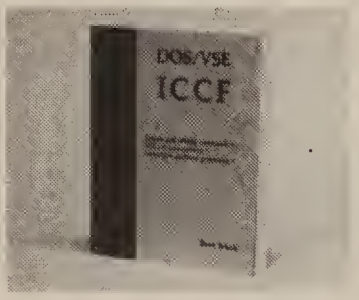

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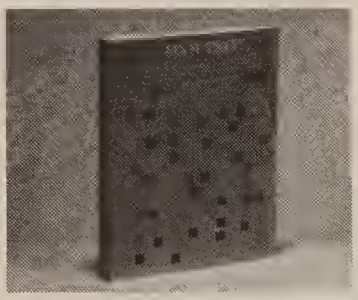

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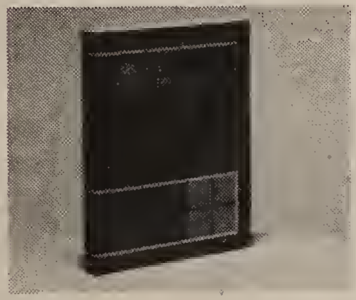

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Mac-VAX link bows

From page 1

Helix VMX uses the Appletalk local-area network (LAN) linked to Ethernet to give Mac users access to a central Helix data base residing on a VAX or Microvax.

"It is a full data base server on the VAX, not just a file server. Most of the application is running on the VAX," said Bob Denny, president of Alisa Systems, Inc., a Pasadena, Calif.-based DEC systems house that provided the implementation of Appletalk on the VAX. "The messages going between the systems are actual data base queries. The data base work is being done by the VAX, and the Macintosh is simply being used as a display."

It was Apple's MIS department working in conjunction with the Apple product development staff that made the Odesta product possible. "The work with the MIS organization has helped us define a very good, long-term networking and communications strategy," said Jean-Louis Gassee, vice-president of product development for Apple.

It was Apple's internal DP needs that prompted the firm to enhance its networking software to work with the VAX. Despite the need for access to larger systems, however, Apple was unwilling to give up the Macintosh interface to obtain access to data on the VAX.

Connection problem

"When you started talking about connecting workstations to host computers, you ran into an immediate problem because all the application software that runs on a host computer is written in a terminal emulation mode. It assumes the terminal device is a dumb terminal, and it communicates in a line-by-line mode," said Joe Nevin, MIS director for Apple.

"That is worthless from a Macintosh perspective because the main feature you gain from the Mac is a whole new concept in the user interface, and if you can't use that in a host environment, what good is the Mac?"

In order to allow users on VAX computers to use the Macintosh icon- and menu-based interface, Apple had to move the protocols from its Appletalk local-area network to reside on a VAX. "We took a step which I believe is a fundamentally strategic step and that was to transport the Appletalk protocols into a VAX environment," Nevin said. Another step, according to Nevin, was to connect Appletalk with Ethernet, the primary network for the VAX. The Appletalk-Ethernet bridge was provided by Kinetics, Inc. of Lafayette, Ind.

Apple then licensed the Appletalk protocols to third-party software developers, including Odesta. "The protocols haven't been announced. It was completed as an internal MIS project about two months ago. Apple owns the source code for this and is licensing this code to third-party software people," Nevin said.

This licensing program is expected to result in a host of debuts from software developers linking applications to the VAX or allowing Macintosh applications to run on the VAX.

"You are going to see a lot more of them," Nevin said of the expected Odesta announcement, and Apple's Gassee agreed. "There is an incredible potential for a wave of things to happen here in a relatively short amount of time," Nevin said.

Neither Gassee nor Nevin would disclose all the vendors licensing the Appletalk protocols.

Helix VMX sells for $450 on a per-Macintosh basis, $7,500 for a Microvax license and $19,000 for a VAX 8600 license, according to Daniel Cheifetz, president of Odesta.

Hardware limitation

After the introduction of single-user Helix in January 1985, Odesta introduced multiuser Helix, which used a dedicated Macintosh as a data base server. Some users, however, could not build large enough data bases because of the limits of hard disks available for the Macintosh.

Both Odesta and Apple saw a market in moving Macintosh applications onto larger systems. "What you now have is an incredible installed base of VAXs that now can provide users with Macintosh's user-friendly access to a very powerful data base capability and go up to a gigabyte or so of data. We have never had LANs available with gigabyte file servers on them before," Nevin said.

Some users are planning to implement Helix VMX. "We have got it in our plans for 1987. We intend to off-load the program that we currently have on our NCR Corp. 8555 mainframe to a micro environment," said Roy M. Endres, vice-president of marketing and sales for Multi-Ad Services, Inc. of Peoria, Ill.

For Endres, the key advantages of Helix VMX include costs savings, greater flexibility and, most important, consistent information for all users. "The information will be current on everybody's screen."

Disadvantage until now

"The disadvantage of using Helix until now has been the inability to have that data base hosted on the kind of computing equipment that has the storage capability and access that this VAX product from Odesta now gives," said James L. Ryan, advisor for systems automation services for Mobil Research and Development Corp. of Paulsboro, N.J.

"We have a large VAX computer installation. Now it is possible to have the end users develop their own data base systems, have the access and capacity that they need, and this can be done with a significant savings to us."

Apple plans to implement Helix VMX as part of a network that is not yet constructed. "We are going to use the product internally. We will be constructing a worldwide network in the first quarter of 1987 that will have a heavy VAX influence," Nevin said. Apple currently has roughly 15 VAXs.

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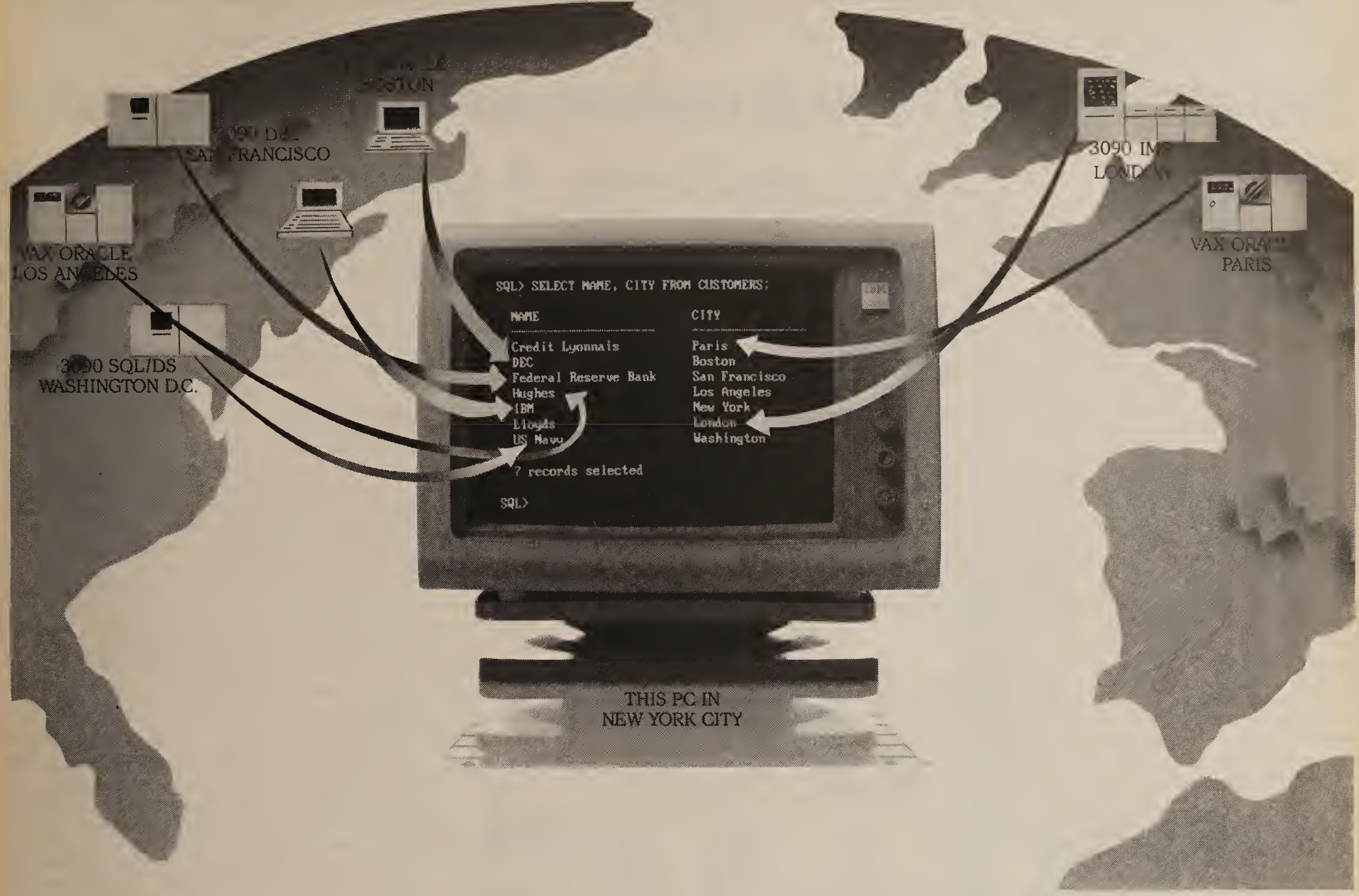

```
SQL> SELECT NAME, CITY FROM CUSTOMERS;

 NAME                      CITY
 ---------------------     ---------------------
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 DEC                       Boston
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 IBM                       New York
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Report claims VDT work does not induce miscarriages

But admits more research needed

By Mitch Betts

Pregnant women who use VDTs for fewer than 20 hours a week do not increase their risk of having a miscarriage, according to preliminary results of a University of Michigan study. But the scientists said more research is needed to determine whether pregnant women who work more than 20 hours a week at VDTs have a slightly higher risk of miscarriage.

"Pregnant women who worked one to 20 hours at VDTs had the same miscarriage rates as women who did not work at the machines," said Professor William J. Butler, who teamed with Professor Kelley Ann Brix on the study. "These findings should relieve the concern for many women who currently use VDTs at their jobs," Butler said.

"The results of our study make it very unlikely that VDTs have a large effect on the outcomes of pregnancies," Butler said, "but we cannot rule out the chance that working with VDTs 21 or more hours a week will increase the risk of miscarriages by 5%. The sample size was not large enough to detect differences as small as 5%."

"If there is an effect among the full-time VDT users, it is less than the effect of other environmental risk factors, such as tobacco and alcohol,"said Brix, an occupational health physician. "But that could still be a public health concern," she added.

University study

Brix and Butler, both of whom work at the University of Michigan School of Public Health based in Ann Arbor, presented their findings last week at the annual meeting of the American Public Health Association in Las Vegas.

The university study, funded by the March of Dimes, is one of the first scientific attempts to determine whether pregnant women who work at VDTs are at increased risk of miscarriages or of bearing children with birth defects. The results for birth defects are now being examined.

Deborah Meyer, spokeswoman for Cleveland-based 9 to 5, the national association of working women, warned that the study is not the last word on VDT health risks.

"For the people we've always been concerned about, the intensive VDT users, this study does not even address the question, let alone provide the right answers," she said. She complained that the study's sample was too small and that the study did not evaluate the effects of VDT-related job stress.

On the other side of the VDT controversy, Renee S. Ross, executive director of the Center for Office Technology, said, "We believe the results will help reassure women that VDTs are safe to use" and added that the research substantiates previous studies conducted in Scandinavian countries that determined VDTs do not affect pregnancies.

The center, based in Washington, D.C., is sponsored by VDT manufacturers and industries employing VDT users.

Ross downplayed the results, suggesting a higher risk of miscarriages for intensive VDT users. "The researchers themselves said that they don't believe that those figures are statistically significant, so they're not conclusive results," she said.

Distribution of questionnaires

The study began last year with the distribution of questionnaires to 5,739 clerical workers at Michigan state agencies, with the cooperation and guidance of the employees' unions and management.

A total of 4,215 women responded, describing their work, the types of office equipment they use, their general history and a history of pregnancies. Of those, 728 women were selected for an in-depth personal interview.

After accounting for the possible effects of known risk factors, such as the age of the women and smoking and alcohol consumption during pregnancy, the researchers found no increase in miscarriage rates for women who used VDTs one to 20 hours a week.

However, there was a slight increase in the number of miscarriages among women who worked more than 20 hours a week at VDTs, although not statistically significant, the scientists reported.

Of the 697 pregnancies reported by women who worked zero to 20 hours a week at VDTs, there were 145 miscarriages, about as many as expected. But of the 120 pregnancies reported by women who worked at VDTs for more than 20 hours a week, there were 26 miscarriages, about four more than expected.

These results cannot be labeled conclusive, however, because this sample of pregnancies comprised such a small share of the total 817 pregnancies, the scientists reported.

Brix said that further study is needed on pregnant women who use VDTs more than 20 hours a week and that a recently announced study of 4,000 women by the National Institute for Occupational Safety and Health (NIOSH) may fill this need because it will examine full-time users.

Both the university and NIOSH studies were prompted by anecdotal reports from across the U.S., Canada and Europe of clusters of women VDT users with reproductive problems. Radiation, stress and coincidence all have been suggested as possible explanations, but there have been too few cases and too much variety in the reports to form sound conclusions, the researchers said.

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Sun unveils windowing product, DBMS software, tool kit

Windowing software based on Postscript, resides on net server

By Rosemary Hamilton

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. is scheduled to announce a series of software packages today that includes a windowing product it plans to promote as an industry standard.

The Network-Extensible Window System (NEWS), expected to be released in mid-1987, will be promoted by Sun in a fashion similar to its Network File System (NFS), networking software that has now been licensed by approximately 80 vendors and universities.

The source code to NEWS will be available to vendors for $25,000 and to universities for $1,000. NEWS will be bundled into future Sun workstations at no extra cost to the user, the vendor said.

Based on Postscript

NEWS is based on the Adobe Systems, Inc. Postscript programming language. It runs independent of the operating system and hardware and was designed to reside on a network server and to be shared among engineering users on the network, the vendor said.

NEWS also provides a platform for developing window-based applications and user interfaces.

Currently, there are other windowing software packages available for the engineering environment, including the X window system that was developed at MIT and has been supported by Digital Equipment Corp.

DBMS software

In addition to NEWS, Sun introduced a new version of its data base management software, Sununify, and announced a front-end tool kit, Sunsimplify, for use with the data base management program. Users of the current version of Sununify, which costs $2,295, can upgrade to Sununify Version 2.0 for free. The new version costs $3,195. Both products are scheduled for availability in December.

Two capabilities have been added to the new version of Sununify. It can now store an unlimited amount of text documents, whereas the previous version could not accommodate documents at all. It can also store raster graphics images.

The Sunsimplify tool kit, which will sell for $1,200, assists users in displaying the data base information in an object-oriented mode and in generating reports from the data. It also provides access to the Sununify query language.

The vendor said each node on a network would require the Sunsimplify tool kit to work with one copy of Sunsimplify residing on a network server.

Communications software

The vendor also released a number of communications software packages, including one that provides support for the Manufacturing Automation Protocol (MAP) specifications.

Sunlink OSI, which now supports the Technical Office Protocol, will now support the seven layers of the MAP specification as well.

The software will provide Sun 32-bit workstations access to a MAP-based network. Priced at $3,000, Sunlink OSI will be available in November.

The vendor is offering two DEC-related products. Sunlink VT100 Terminal Emulator, which costs $500, allows Sun users to run DEC VT100 emulation in a window on a Sun workstation, providing access to DEC systems.

The Sunlink DNA enables users to communicate via a Decnet local-area network using Decnet protocols. It also allows users to communicate with Transmission Control Protocol/Internet Protocol, giving users access to other Sun workstations on an Ethernet-based network.

Sunlink DNA costs $1,200, according to the vendor. Both DEC-related products will be available next month.

Finally, the vendor released software to connect Sun workstations to wide-area and packet-switched networks. The products will be available in November.

Sunlink DDN provides access to the Defense Data Network and will sell for $4,000. Its Sunlink CCITT X.25 softare product has been enhanced to support the X.29 and X.3 protocols. The enhancements provide terminal-to-host communications as well as virtual terminal sessions. The product costs $2,500.

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Sytek announces additions to System 6000 PC networks

Line can accommodate more than 1,000 nodes

By Douglas Barney

MOUNTAIN VIEW, Calif. — Sytek, Inc. last week announced several additions to its System 6000 line of personal computer networks that can accommodate more than 1,000 nodes.

The System 6000 now includes a $695 electronic mail package called the Network Courier, developed by Consumer Software, Inc. of Vancouver; the 6430 IBM Systems Network Architecture (SNA) Gateway, which allows System 6000 users to link with IBM host computers; a specially configured Novell, Inc. Netware/6000 network operating system; and three network servers. Netware/6000 has a base price of $2,045.

In addition, the system includes the $6,560 6420 Internetwork Bridge, designed for communications with the Sytek System 2000 Broadband network and Localnet 20 broadband terminal-to-host local-area networks. The bridge also works with the IBM PC Network.

The bridge allows up to 16 personal computers to simultaneously emulate an asynchronous terminal and tie into host computers via Sytek's System 2000, Joseph Seidler, Sytek's vice-president of product marketing, said.

"We have one of their bridges, a very early version, and it seems to work very well for the terminals that it was designed for. Unfortunately, that list of terminals doesn't include what we would like most to see, like Digital Equipment Corp.'s VT240, but I understand that is coming out shortly," said Randolph S. Knipp, senior engineer at Du Pont Co. of Orange, Texas.

According to Seidler, emulation of both DEC's VT220 and VT240 is on the way. "We will have it," Seidler said, but he declined to give a delivery or announcement date.

For Knipp, the bridge product is important. "It gives Sytek a good mechanism for users who have a lot of investment in other network equipment to be able to use the features of the IBM PC Network and vice versa," Knipp said.

The firm also announced network servers, including the $9,995 6611 with 75M bytes of storage, the $13,300 6620 and the $13,995 6621, which provide up to 150M bytes of storage.

Sytek also announced the 6430 SNA Gateway, a $3,950 product that allows PCs to link with SNA mainframe networks. The gateway boasts a hot key to switch between Microsoft Corp. MS-DOS and SNA sessions and includes a 16-bit intelligent communications board with 512K bytes of random-access memory.

The 6430 SNA Gateway allows up to 32 PCs on a System 6000 network to simultaneously emulate an IBM 3270 terminal and hook up to SNA, Seidler said.

> ***'The Internetwork Bridge gives Sytek a good mechanism for users who have a lot of investment in other network equipment.'***
>
> — Randolph S. Knipp
> Du Pont Co.

Sytek's product line is based on IBM's Netbios, a networking standard that Sytek developed with IBM and that allows the System 6000 to work with the IBM Token-Ring net and PC Network as well as with compatible hardware and software.

According to David Ferris, president of Ferrin Corp., much of Sytek's strength lies in its tradition of selling direct to MIS/DP. In fact, the average number of nodes on a Sytek network is 250, Ferris said.

Knipp agreed with Ferris. "I have been very pleased with the relationship we have with the Sytek people," Knipp said. Sytek is also becoming more flexible in developing products to users' specifications, Knipp added.

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Info managers focus on bottom line

Aim to add value, not technology

By David A. Ludlum

DALLAS — Wedding the management of information systems to overall business goals dominated talk among executives gathered last week for the Society for Information Management's annual conference.

"The real issue, I believe, is to have a much better understanding of what the business is about, to make sure what we're doing is adding value," said Jay R. Hamann, vice-president of MIS at Schreiber Foods, Inc., a Green Bay, Wis., cheese producer.

"By focusing on the technology, we've left the impression that all we have to do is find the right piece of technology, and all of our problems are solved," said John Hammitt, vice-president for information management at the Pillsbury Co. in Minneapolis. "It's not buying the right computer; it's thinking through how the business should be different."

Lack of software, leadership

In his portion of the keynote address, Bobby R. Inman, the outgoing chief executive officer of Microelectronics and Computer Technology Corp., identified a lack of software and a lack of federal government leadership as major industry "stress points" in the future.

"The states that spend vastly more on education will be the ones that lead. The others will fall behind," Inman said.

Robert E. Allen, president of AT&T and another keynote speaker, called for the federal government to establish a national policy on "information movement and management," citing its policy on telecommunications as a precedent. "The marketplace tends to be myopic," Allen said.

The third keynote speaker, Digital Equipment Corp. founder and chairman Kenneth H. Olsen, praised the virtues of companywide networks. "The network is sacred. It is the holiest of holies," Olsen said. He added, however, that corporations must rethink their goals in light of networks to make full use of them. "They could be a disappointment in the same way personal computers were," Olsen said.

Other proceedings focused on issues of technology and human resources. The latter is key for Marvin W. Ehlers, vice-president of MIS for Midcon Corp., a natural gas pipeline operator in Lombard, Ill.

"The people issues are critical," Ehlers said. "We need to get the staff to cope with change and to initiate change, not only because of the rate of change but because many times we hate to change ourselves."

In the lead address on technological trends through the year 2000, Michael Dertouzos, an MIT professor, identified the three dominant developments as widespread adoption of multiprocessing, distributed processing and intelligent systems.

Dertouzos said that in the future, information managers will adopt a "city plan" approach of establishing standards and overseeing common resources such as networks, widely used applications and data servers, leaving end users relatively free to work within the plan.

Major MIS concerns

In the lead address on human resources, Daniel Couger, a professor at the University of Colorado, presented the results of a study on major concerns of MIS managers today and singled out those he expects to remain crucial.

The concerns included defining the skills needed by personnel and retraining workers. These will always be concerns, Couger said.

"We will need a much heavier dose of creativity and innovation in the future," he added.

Ashton-Tate releases tool kit for Framework, Dbase utilities

By Peggy Watt

LOS ANGELES — Ashton-Tate has produced Developers' Toolkit for Framework II as part of an effort to boost the integrated package as an application development tool.

Also recently announced was Dbase Programmers' Utilities, with several dozen Dbase and operating system utilities to help users manage and customize Dbase applications.

Both the $99.95 Developers' Toolkit and $89.95 Dbase Programmers' Utilities were announced at Ashton-Tate's Developers Conference last week. They run on IBM Personal Computers and compatible systems.

The Developers' Toolkit, which is scheduled to be available by the end of the year, includes routines and utility programs to help developers design custom applications using Framework II's Fred programming language. The tool kit's utilities work with both Version 1.0 and 1.1 of Framework II.

Many of the tool kit's utilities are programming shortcuts used by Framework's developers within Ashton-Tate, said Dave McLoughlin, project supervisor. "We're supplying the tools to the user to go beyond the limitations of the commercial release," McLoughlin said.

The Developers' Toolkit also includes guidelines to create new import and export file utilities and to maintain and use Dbase files within Framework II. It also provides computer-based training information.

The Dbase Programmers' Utilities package works with Dbase III Plus and all versions of Dbase III. The Dbase Programmers' Utilities package is available now at retail outlets and from Ashton-Tate.

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VIEWPOINT

EDITORIAL

Succeeding in an IBM-DEC world

Ever since it became the first major software company to go public back in 1978, Cullinet Software, Inc. has been viewed as something of an industry bellwether. Cullinet was, after all, bold enough to challenge IBM at the data base management game, first with IDMS and then with IDMS/R, saying it intended to rack up quarterly profits in the process. What is more important, the company went beyond claims to performance.

Now comes Cullinet's latest bold thrust, articulated at what the company chose to dub a "blueprint" press conference. According to this blueprint, Cullinet intends to produce within a year a relational data base management system for Digital Equipment Corp.'s VAX line of computers.

In a second, parallel move, one that garnered less attention at the press conference but was probably more significant, Cullinet said it wants to field a personal computer-based application development system that will one day be the starting point for applications to run on both its IBM mainframe and VAX data bases.

Some Cullinet watchers, like the best Kremlinologists, immediately focused on what the company did not say. As everyone knows, sales of mainframe data base management systems have slowed drastically since the 1984 boom.

As a result, Cullinet has gone from being a consistently profitable company to its first losing quarter and is likely to experience one or two more before the end of its fiscal year. Does the "blueprint" for the VAX mean Cullinet is backing away from mainframe systems software?

Absolutely not, said Cullinet Chairman John Cullinane, when questioned on this point by *Computerworld.*

Remaining a mainframe software vendor, in fact, is part of the VAX strategy. Cullinet is betting that users want a dual VAX-IBM world, with VAXs serving as departmental processors and IBM mainframes serving as the central processors and guardians of the corporate data base.

Cullinet is also betting that neither IBM nor DEC can be expected to totally bridge these two worlds on its own, creating an opportunity for aggressive independent software vendors.

Not unimportantly, the VAX strategy has done little to quiet Wall Street skeptics, some of whom would rather see Cullinet invest its development dollars in a relational product to compete with IBM's DB2.

So far, we think Cullinet has a better idea than Wall Street. From all we hear and see — including VAX sales figures — we think departmental processing is already happening. And most certainly, users will want, as always, bridges that allow easy, flexible communication between those departmental computers and central processors, most often those of IBM.

Whether Cullinet will succeed as the industry's bridge builder is still an issue to be resolved.

At the very least, the company has taken pains to see the world of data processing from the point of view of a growing number of users.

While its strategy is not without risks, Cullinet has based its direction on what many believe will be a real and pressing user problem.

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LETTERS TO THE EDITOR

DBMS rating not accurate measure

An article titled, "Vendors rated on a new scale," incorporated in William Inmon's In Depth article, "A new measure of software speed narrows DBMS buyer's choices" [CW, Sept. 8], contained one error.

Software AG of North America, Inc.'s Natural does not require conversational mode under CICS as asserted in the article. It can be run conversationally, and this may account, in large part, for the horrendous performance figures shown for Software AG's Adabas.

While I feel the approach Inmon took has some validity in attempting to measure performance, it would be very foolish to select a DBMS solely on its ranking on this new scale.

As pointed out in the article, there are a very large number of factors to be considered when choosing a DBMS, but theoretical performance is only valid when the underlying metric closely relates to performance in the real world.

In my opinion, based on my firm's work with Adabas, the chart included with this story shows numbers for Adabas that are off by a factor of at least three in each instance.

To me, there is a real question surrounding the validity of using physical I/O as the comparison metric.

Inmon's new rating really only measures the responsiveness of the particular I/O handler, not the ability of the underlying DBMS to respond to a given work load.

If I were given the task of determining which DBMS's performance was better, I would have to do it on the basis of performing some amount of measurable work, in an application sense, and comparing various systems to see which was best.

Most Adabas installations track the performance of their data base by measuring calls to the data base. Very roughly, a transaction, as defined by Inmon, would take at least three calls to accomplish its work. As recently reported by one of our clients, an IBM 3090 Model 200 is capable of sustained calls to Adabas at the rate of 56 calls per second for *each* of the *two* Adabas data bases on the same CPU.

This equates to about 50,000 calls per 15-minute interval during peak traffic periods, with four to five million per day being typical for each of the two copies of Adabas running. This is a mix of accesses, both on-line and batch.

Although the combined rate of 112 calls per second might not be sustainable against a single copy of Adabas, it should be close, since this machine does other work besides running Adabas.

Selecting the proper DBMS is getting to be a more difficult task with each passing day. While underlying performance may be a factor, especially for certain time-critical applications, there are many more issues that need to be addressed.

While listing these issues exhaustively is beyond the scope of this letter, my firm has become determined that one major factor often overlooked in the selection process is the application development environment provided as part of the DBMS's package of tools.

Raw power that cannot be tapped because the programming staff is too tied up with the manifold details required to generate an application, as is the case with IBM's IMS, does not mean much.

In contrast, a DBMS, such as Adabas, that provides a rich application development environment including a real fourth-generation language, like Natural, and a tool to enhance end-user access to data and to enhance programmer productivity, such as Super Natural, can produce working applications that perform adequately, given today's powerful machines.

Nick Cvetkovic
President
N. B. C. Associates, Inc.

Buyers beware of 'best' DBMS

In response to your article,"Vendors rated on a new scale" [CW, Sept. 8]: Let's get serious. One can experiment with questions, answers and analyses until blue in the face from trying to find out which data base management system on the market excels as "the best DBMS to purchase."

Hypothetically speaking, if one's analysis did prove that one single vendor marketed the most powerful, efficient and flexible DBMS, let the buyer beware.

Remember, the DBMS, when purchased, comes empty. One must build the integrated data structures. If that is botched, forget the power, efficiency and flexibility.

Above all, the heck with the advantages of "relational."

Wanda R. Black
Data Base Manager
Dairymen, Inc.
Louisville, Ky.

VIEWPOINT

Dying on the vine: Big shows give way to chic counterparts

By AMY D. WOHL

Big shows are running small this year. The Office Automation Conference (OAC) ended with a whimper, at a third of its peak size. The National Computer Conference was a disaster, with perhaps one-third to one-fourth of its normal exhibits — and attendees. The American Federation of Information Processing Societies' (AFIPS) new NCC/Telecommunications show in Philadelphia last month was another near-disaster; certainly, the vendors had plenty of time to offer each other demos.

While these and other big shows are dying on the vine, the smaller or more focused shows are doing quite well.

Look at Novell, Inc.'s Networld conference, held in Dallas, for instance. Sounds like a users group meeting, right? Remember that Novell has sold more than 60,000 copies of its Netware local-area network (LAN) operating system and has about 300,000 users. An additional 5,000 systems are being added each month, with an average of five users per system. That's an anticipated 300,000 users in the next 12 months.

Novell attracted hundreds of conference attendees to the Dallas Infomart — and several thousands of attendees to its show floor, which was jam-packed with all kinds of LAN, telecommunications and office automation software. Here were the vendors that AFIPS had hoped to attract to NCC/Telecommunications and the customers to admire, consider and buy the wares.

Or consider a single-vendor show like Decworld, which targeted Digital Equipment Corp. tools and attracted more than 30,000 attendees (possibly more than this year's NCC) to its February-in-Boston fiesta.

And think about the success of Macworld, targeting Apple Computer, Inc.'s personal computing machinery, which is much bigger than either NCC/Telecommunications or OAC, and the new electronic publishing and desktop publishing events such as the Seybold Desktop Publishing show held last month in California. Consider any well-run personal computing show, especially Comdex. Think about Comnet and Interface, growing in size each year.

Why do users go to these newer, narrower shows while they scorn the older, established, broader conferences and exhibits?

Consider the following possibilities.

- Consistency and predictability. The old, broader shows swing with the pendulum of fashion and vary wildly from year to year. The wary user has learned that a show like Info or NCC can look like an office automation show one year, a minicomputer software show another year and a random selection of computer-related events in still another year. When money is tight, that user may opt to spend his bucks where he can count on getting the sort of emphasis he is looking for.

The narrowly focused shows do a better job for vendors, too. When the show is targeted at specific customers, vendors get to shoot with a rifle instead of a shotgun — and that means saving lots of otherwise wasted ammunition. Narrower shows can be less risky for show organizers, too; targeted audiences mean smaller promotional mailings — and the mailing can be the most expensive item in a show budget.

- Newness. The focused shows are generally newer, and they are titled to indicate their focus on the newest and most chic technology issues. Just look at the technological success stories: artificial intelligence, local-area networks, desktop publishing, personal computers. They are on everyone's hit parade this year.

It is easy to recognize a crisply targeted show that focuses on a shiny new topic — and it is easy to decide that "keeping up" means you should attend. First efforts often make up for any time chaos by paying sharp attention to program planning and featuring the best speakers. The speakers come because they are trying to get established as the field leaders in the newest and most chic subjects, too.

This indicates a certain kind of downside risk. If the focused shows succeed because they shine a spotlight on what is new and perhaps important, they may fade quickly when the spotlight shines somewhere else. That's okay, as long as the topic has become minimally interesting or has become incorporated into other shows.

Word processing is one example that comes to mind. It used to draw tens of thousands of interested people; then it became incorporated into other markets.

- Fashion. Styles in computing come and go. Old ones become less stylish, and new ones replace them. The underlying basics may or may not change.

Think of office automation, end-user computing personal computer interconnection. These topics are slightly different technological answers to the same question: How do you give people who are not computer professionals access to some computer power and to the data that is stored in computer memory?

Office automation did it through time-shared mainframes and the interconnection of PCs with an emphasis on narrative documents or text.

End-user computing does it through the support of users, employing a variety of computer devices but currently focusing on PC workstations and their connection to mainframe computers, with an emphasis on moving data from one system to another.

The interconnection of personal computers often focuses on local-area networks, emphasizing the interconnection of users and their need to communicate, share data and access shared devices.

Changes in fashion did not change the problem; they just changed the way we looked for answers. But new technologies did change the problem-solving environment. Vendors changed, products changed and experts changed. Maybe that is another good reason for changing what shows we go to — to get rid of old experts who have not kept up with the changes in technology and style.

In the final analysis, going to a particular show year in and year out is like belonging to a particular club. As long as the club satisfies your needs for information and social interaction with your peers, the show will succeed. When you move on because your point of view, your job or the technology you use has changed, one of two things may happen: Others may enter the procession, because the club is still, in fact, worth joining, or the old game may be coming to an end. Unless the club finds new games to entertain its members and to lure new members, it will fade away.

We use shows to help us understand trends that are dying and new ones that are taking off. We love nothing so much as a new show — as long as it works.

We are like kids in the candy store, noses pressed to the glass, looking for the newest, the best, the thing that will make us jump up and down and feel that we're ahead of the game — for just one minute.

Wohl is president of Wohl Associates in Bala-Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

Information technology requires incorporation, not delegation

READER'S PLATFORM

By JOHN G. SIFONIS

Information systems, whether custom-built or off the shelf, are not working. Companies are spending millions of dollars, and their managers are then watching with teeth-clenched frustration as the systems for which they had such high hopes sputter (electronically speaking) and die.

The scapegoats for this mess are, of course, MIS directors. "Technicians," these management people say, "have ruined our system."

In my opinion, this criticism is due to high expectations that management holds for technology, even in the face of reality.

Backlogs, cost overruns and long system development cycles continue to be a part of the computing environment.

Shift in thought needed

What is needed now is a shift in thinking on the part of management. For far too long, most managers have considered information technology an area to delegate — and delegate completely. Technology has not been considered a management issue or one worthy of much attention.

This logic could be anything from fatal to very damaging, depending on the company.

Current criticism of MIS directors reflects this lower level and piecemeal approach to curing what ails information technology.

A notable example is a recent *Harvard Business Review* article titled, "Save Your System from the Experts." The author, a telecommunications manager and assistant professor, maintains that communication between management and technical people is the key to fixing information systems.

While communication between these groups is indeed important, it is merely a stopgap measure.

As information technology evolves, it will, at the same time, become out of date, because top managers will be creating their own systems, eliminating the need for so-called technicians.

Strategic planning

Information technology is a resource, just as people and capital are resources, and it must have a place in business's strategic plans.

A business's strategic plan sets the course, and an information technology plan, by reflecting the business's goals, lends direction and develops policies and aspiration levels.

The result will be a concrete information technology resource plan, emanating from top management, that provides for the technological infrastructure in support of critical business goals.

The only solution

Strategic planning for information technology is the best solution. It is, in fact, the only solution for creating and sustaining information systems that work.

By incorporating information technology into strategic planning, money will be spent more wisely and technology will be applied to the business areas that count.

Companies that follow this approach will find that, ultimately, information technology may become the wedge that helps a company shove off from its competition.

Sifonis is national director of Information Technology Consulting Services at Arthur Young, an international accounting and management consulting firm.

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SYSTEMS & PERIPHERALS

HARD TALK
James Connolly

Honeywell acts the coquette

The statement was probably made to build employee, investor and customer confidence. There was a string of promises about Honeywell, Inc.'s plans to be "a more effective competitor" while offering customers a "compatible product line, greater stability and more services."

But rather than instilling confidence, Honeywell's Sept. 24 move may create a monster. It leaves one wondering where Honeywell Information Systems Division is heading because it feeds rumors that this division is being dumped on a vacant lot — or a used car lot at best.

The strangely worded statement said that Honeywell wanted to negotiate an unspecified agreement with NEC Corp. and Groupe Bull while somehow building up Honeywell Information Systems. If nothing else, the statement could have been read as an admission that Honeywell itself doesn't know what it wants.

If it is true that Honeywell's management doesn't have a plan — which is the impression the statement gives — how can Honeywell customers remain confident that their systems will be supported and enhanced? Some Honeywell users who are looking at the possibility of NEC taking more control over Honeywell's large-systems operation started out as General Electric Co. customers. They watched Honeywell take over the GE computer operation and then saw Honeywell replace much of its own product line with NEC-built mainframes.

Those customers may have no qualms about NEC taking over more

See **HONEYWELL** page 24

Connolly is Computerworld's *senior editor, systems & peripherals.*

DEC releases VAX drive

Remote terminal server and 159M-byte disk out

By James Connolly

MAYNARD, Mass. — Claiming the lowest cost per 1M bytes of capacity for any of its RD series of disk drives, Digital Equipment Corp. has announced a 159M-byte Winchester disk drive for use with its Microvax II and Vaxstation II/GPX workstations.

In a separate announcement, DEC introduced its Muxserver 100/Decmux II remote terminal server for connecting terminals, printers and personal computers to an Ethernet local-area network.

The 5¼-in. RD54 disk drive is targeted at applications in office, engineering and educational environments requiring large storage capacities in compact deskside systems.

According to DEC officials, the RD54 can be used with any Microvax II or Vaxstation II/GPX system using DEC's RQDX3 disk controller. It can be installed in the field by DEC service personnel. The company said the deskside enclosure can hold up to three of the drives, providing up to 477M bytes of storage in a single system.

DEC also announced a new standard configuration for the Microvax II incorporating two RD54 disks. That system features 318M bytes of disk storage, 9M bytes of memory, a 95M-byte streaming tape cartridge drive, a console serial line and a Decnet Ethernet controller for $45,400. DEC officials also said three Vaxstation II/GPX configurations, including the RD54, are available.

The RD54 costs $7,900.

The Muxserver 100/Decmux II complements DEC's line of Ethernet terminal servers, including the Decserver 100 and the Decserver 200, according to William E. Doll, marketing manager with DEC's Computer Special Systems Group.

The Muxserver 100 reportedly supports up to 16 remote users while acting as a network switch for one or more host computers. It was designed to connect locally to Ethernet and to combine the capabilities of

See **DEC** page 24

DATA VIEW

Trading places

Communications hardware expected to edge out mainframe hardware

Acquisition Plans – 1985
Expansion to present hardware: 67%
Expansion to data communications facilities: 65%
Additional proprietary software: 61%
Additional software from manufacturer: 52%
Business graphics: 14%

Acquisition Plans – 1986
Expansion to data communications facilities: 68%
Expansion to present hardware: 65%
Additional proprietary software: 62%
Additional software from manufacturer: 53%
Laser printers: 26%

Rankings based on Datapro Research Corp. surveys of mainframe sites in February 1985 and February 1986.

Beehive adds to terminal line

By Jeffry Beeler

SALT LAKE CITY — Beehive International, Inc. last week updated its terminal line with the introduction of three IBM 3270-compatible units that Beehive said cost 10% to 19% less than their IBM counterparts and support features the rival products lack.

The additions to Beehive's terminal family include the Models 179, 180 and 191, which correspond to IBM's 3179, 3180 and 3191, respectively. Together, the three Beehive units form the company's Advanced Terminal Line (ATL), which uses a modular design and common logic boards to minimize servicing and spare parts requirements, according to Lamont Crabtree, the firm's 3270 product family manager.

By using the same 16-bit Motorola, Inc.

See **BEEHIVE** page 21

INSIDE

Apollo boosts low-end workstation's performance/**20**

Xerox enhances laser printer/**20**

NAS storage system quadruples capacity/**24**

IBM Series/1 add-in memory devices bow from Cambex/**24**

NEW THIS WEEK

- Calma Co. enhances its GDSII integrated circuit design system
- For more on this and other new products, see pp. 123-151.

INSTANT ANALYSIS

"The NEC influence is creeping in more and more every day. NEC is gradually taking over Honeywell's computer operations."

— Thomas Henkel, Yankee Group analyst, on the prospect of Honeywell, Inc. and NEC Corp. combining their businesses.

Datachecker Systems 32-bit CPU ups retailers' info power

Point-of-sale machine uses National Semi chip

By Donna Raimondi

SANTA CLARA, Calif. — National Semiconductor Corp. subsidiary Datachecker Systems, Inc. has introduced three point-of-sale (POS) products, including a 32-bit processor.

The company's top-of-the-line Series 3000 POS system is based on National Semiconductor's 32000 32-bit processor chip. The Series 3000 is geared to drug and general merchandise industries but can be adapted to other industries, Datachecker said.

"Having a 32-bit controller in the manager's office means the individual store has more processing power for more complex applications," said Peter Cohen, senior consultant at Framingham, Mass.-based International Data Corp. Datachecker's is the first 32-bit POS system available. IBM and NCR Corp. are the firm's chief competition; neither has a 32-bit system, Cohen said.

"With a 32-bit processor, you could do totalling on-line and do more applications, like maintaining a mailing list and scheduling employees," he explained.

A typical configuration for a five-lane retail store would cost from $50,000 to $55,000 and include five terminals, five scanners, a star controller, proprietary software and an operating system.

Since 1983, when Datachecker (which until recently was known as Datachecker/DTS Corp.) acquired Data Terminal Systems of Maynard, Mass., the company has been evolving from a vendor of supermarket-only sales systems into one offering complete systems for a variety of businesses.

Datachecker also released the 2200 Keyscan System, a POS terminal for small retailers such as four- to 10-lane drug, convenience and variety stores. The 2200 is said to provide an expansion path from the Datachecker 2100 electronic cash register.

A typical configuration for a five-lane store costs approximately $30,000 and includes five terminals, displays and scanners; a Series 600 or 900 Store Computer with the Microsoft Corp. MS-DOS operating system; and Datachecker's Keyscan software.

The single-user Series 900 Store Computer — compatible with IBM's Personal Computer AT — is based on Intel Corp.'s 80286 chip. It includes 640K bytes of random-access memory, a 40M-byte internal hard disk drive and a parallel port. The unit costs $5,895 for a monochrome model and $6,395 with a color monitor.

Options also include a 60M-byte internal streaming tape backup, priced at $1,695; a 2,400 bit/sec. internal modem costing $799; and 80- and 132-col. printers that range in price from $850 to $1,100.

Apollo boosts workstation's performance

By Rosemary Hamilton

CHELMSFORD, Mass. — Apollo Computer, Inc. has announced a number of options to increase the memory and storage capacity and improve the graphics and communications performance of its Series 3000 low-end workstation, which was introduced earlier this year.

When configured with the new options, the Series 3000, which has a base price of $9,900, will be priced between $30,000 and $35,000.

The options would boost the maximum main memory from 4M bytes to 8M bytes and increase the disk storage from 72M bytes to a maximum of 348M bytes. The 8M-byte memory option costs $8,000.

An upgrade from a 72M-byte disk drive to a 155M-byte drive costs $4,900; an upgrade from a 72M-byte disk drive to a 348M-byte disk drive costs $9,400. Both the main memory and storage options are available now. According to the vendor, the combined memory and storage enhancements can provide up to 50% greater applications performance than a current Series 3000.

Apollo is now offering a 19-in. color monitor with 1024- by 800-pixel resolution that can display up to 16 colors simultaneously from a palette of 4,096 colors. Current users can upgrade from the Series 3000 15-in. monitor at a cost of $3,800. The 19-in. monitor, which will be offered with new systems, has not been priced separately. A standard system with the monitor and 8M bytes of main memory will have a base price of $23,200.

The vendor also announced two communications options. A Serial/Parallel Expansion (SPE) board would add two RS-232 serial ports and one parallel port to the workstation. It costs $650 with the associated SPE software and will be available within 60 days of order.

Along with the SPE board, Apollo said it offers software to support the Tektronix, Inc. 4692 Color Ink Jet Printer. The software, which costs $300, drives the printer through the SPE board's Centronics Data Computer Corp. port. The TEK 4692 Series 3000 kit, including the software driver and the SPE board with the Centronics port, costs $925 and will be available within 60 days of order.

A controller board linking the Series 3000 to Ethernet-based networks was also announced. Ethercontroller-AT, which costs $2,000, supports Apollo's Ethernet-based software products, including its Transmission Control Protocol/Internet Protocol gateway software designed for communicating with other vendors' systems and its Etherbridge software, used to connect its remote Domain networks via an Ethernet network. Ethercontroller-AT will be available within 60 days of order.

The vendor also said orders can be placed for its IBM Personal Computer AT-compatible coprocessor board, the Domain/PCC, which was announced in February. The board is priced at $2,000.

Xerox revamps 3700's storage, graphics

By James Connolly

ROCHESTER, N.Y. — Xerox Corp. has announced hardware and software improvements, including increased storage and improved graphics facilities, for its Xerox 3700 laser printing system.

Xerox officials said the enhancements were intended to better position the Xerox 3700 for three distributed printing environments: batch data processing, interactive data processing and office printing. The 24 page/min. printer can reportedly be used with personal computers, medium-size systems and mainframes.

The enhancements include a software release and the offering of a larger stacker as standard features. The other enhancements are options.

The new output stacker has a capacity of 2,000 sheets, instead of the previous 500 sheets, to allow longer continuous runs. The stacker collates and offsets jobs and sets within a job.

Transmission capabilities

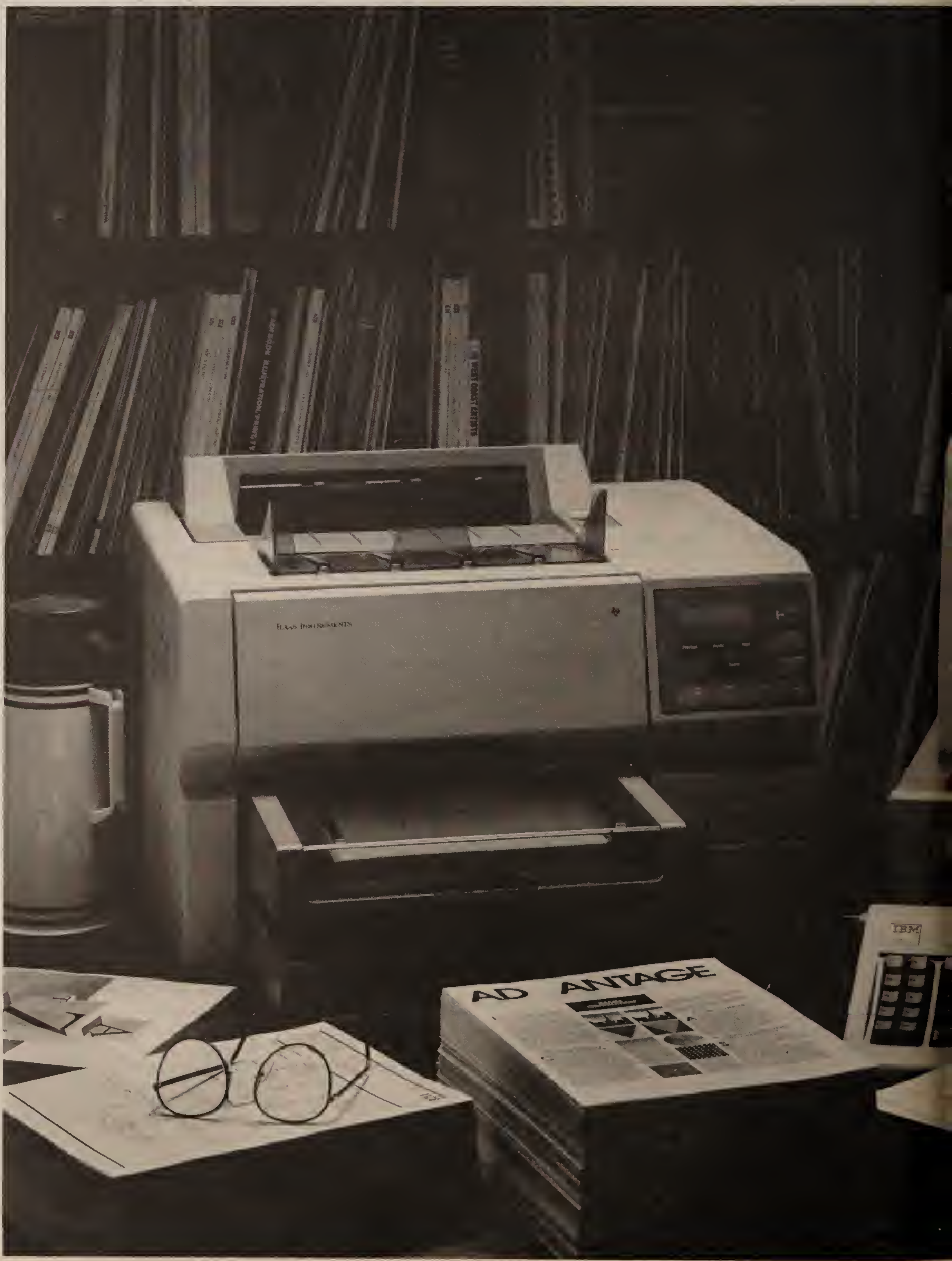
The storage option is a 50M-byte disk drive that is designed to increase the number of pages that can be printed without retransmission. The standard drive has a capacity of 10M bytes.

Another option is a 1M-byte image generator, which is said to provide more storage for complex fonts and graphics than the standard 256K-byte image generator.

Two source data modules include a built-in IBM Systems Network Architecture/Synchronous Data Link Control unit that provides for remote batch printing and an Ethernet connection.

In addition to supporting the hardware enhancements, the new software adds vector graphics support and macro-level commands to produce figures such as polygons and pie slices.

The output stacker can be added to existing Xerox 3700s for $1,500. The 1M-byte image generator and the 50M-byte disk drive each cost $1,995. A basic Xerox 3700 equipped with the larger output stacker costs $29,995.



Calma enhances DEC-, Apollo-based CAD/CAM packages

Also offers GE's 3-D graphics processor as option for system

By Rosemary Hamilton

MILPITAS, Calif. — The Calma Co., a subsidiary of General Electric Co., has introduced an enhanced version of its DDM computer-aided design and manufacturing (CAD/CAM) system that runs on both Digital Equipment Corp. and Apollo Computer, Inc. hardware.

The vendor also said it will offer the Graphicon 700, a three-dimensional graphics processor introduced by GE earlier this year, as an option for the new Prism/DDM system.

Prism/DDM, scheduled for shipment in November, will be offered as a complete system or as unbundled software. It includes an enhanced version of the Design Analysis Language, Calma's CAD/CAM programming language, which now allows users to create three-dimensional solids, surface and wire-frame models and two-dimensional draft sketches.

Integrated data base

Data is stored in an integrated data base, allowing users to extract information from one design and apply it to another, the company said.

The Prism system also provides for nongraphic data to be stored in the data base. The system supports Version 3 of the American National Standards Institute Initial Graphic Exchange Standard, which provides for a standard format in which graphic data can be transmitted.

Running on a DEC Microvax II, the Prism/DDM costs $69,000 per seat in a three-seat configuration. A single Microvax II-based unit costs $105,000.

Apollo-based Prism systems will be offered only on a single-unit basis. A system based on the Apollo DN570A costs $78,500, and an Apollo Series 3000-based unit costs $51,800.

Currently, the optional Graphicon 700 processor, which Calma is marketing as the G700, is available only on the Microvax II-based system. The Prism/DDM three-seat configuration with the G700 is priced at $91,00 per seat.

Current line compatible

Calma's current line of DDM systems are fully compatible with the Prism system, the vendor said.

A software upgrade to the Prism environment is available, with pricing starting at $9,000, according to John Kidd, Prism/DDN product manager.

Calma will offer the Prism software-only package at $27,900 for both DEC and Apollo hardware.

Beehive adds to terminal line

From page 19

microprocessor in all three terminals, Beehive has also enabled the product line's base model, the ATL-191, to be upgraded in the field to the ATL-180, Crabtree said.

All three ATL family members work with light pens and support a 2K-byte record-and-play feature and a user-programmable screen saver. The terminals also allow users to do screen dumps locally on a low-cost ASCII printer, Crabtree said.

Their IBM equivalents, by contrast, are able to do this task only if they have a much more expensive printer that connects indirectly to the terminals. Moreover, none of the IBM display units support a light pen, and only the 3180 comes with a record-and-play feature, he added.

The ATL-179 color monitor lists for $1,895, compared with $1,695 and $1,295, respectively, for the monochrome ATL-180 and ATL-191.

TI's new OmniLaser™ page printer can turn your PC into a desktop publishing system.

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Overall, TI's second generation laser printers offer up to 10 times the duty cycle, 15 times the machine life and five times the paper capacity offered on their first generation counterparts. These advances, coupled with lower maintenance costs and user-replaceable consumables, significantly reduce the costs of ownership. In fact, at pennies per page, the OmniLaser's per page cost is among the lowest in the industry.

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NAS releases storage system

By James Connolly

MOUNTAIN VIEW, Calif. — National Advanced Systems Corp. has announced a model of its 7900 Semiconductor Disk Storage Subsystem (SCD) with four times the capacity of the earlier model.

The upgraded system is called the 7990-2X Storage Unit. According to NAS officials, the unit features a minimum storage capacity of 128M bytes with the ability to expand that storage to 512M bytes in 128M-byte increments. The company said a user can attach four 7990-2X units to a 7970-2 Control Unit to achieve a subsystem capacity of 2G bytes.

Announced a year ago, the SCD was designed to store data on high-speed memory devices. It features a built-in hard disk and battery backup unit designed to eliminate the volatility problems of earlier semiconductor disk storage systems.

David Turner, vice-president and general manager of NAS, said the semiconductor storage subsystem can increase overall system performance, particularly in multiple large-processor complexes such as the NAS AS/XL series of mainframes.

The 7990-2X will complement the existing 7990-1X subsystem, which has a capacity ranging from 32M to 128M bytes, according to Turner.

A 128M-byte 7990-2X costs $382,800. Additional capacity costs $339,600 per 128M-byte increment.

Cambex claims cost, space savings for IBM Series/1 memory boards

By James Connolly

WALTHAM, Mass. — Cambex Corp. has announced a series of add-in memory boards designed to take up less space at a lower cost than IBM-supplied memory for the IBM Series/1 minicomputer.

The boards compose the Cambex Certainty 110 series and are available in three sizes. The Certainty 110-10 offers 1M byte of storage, the Certainty 110-15 offers 1.5M bytes and the Certainty 110-20 provides 2M bytes of storage, according to Cambex officials.

"Cambex offers Series/1 users greater flexibility. With the Certainty 110 series, users can fine-tune their systems, adding incremental memory as needed. Further, users of older Series/1 4956 processors can protect their initial memory investment and easily increase the memory capacity of their system," said Louis J. Finnegan, vice-president of marketing for Cambex.

He added that the boards need to use only one memory socket in the Series/1 chassis to reach the maximum memory capacity.

The Certainty 110-10 costs $2,400, the Certainty 110-15 costs $3,500 and the Certainty 110-20 costs $4,600.

Honeywell acts the coquette

From page 19

of the Honeywell mainframe operation. They may even welcome such a move. Honeywell's small-systems users may be happy to see Bull expanding its role in Honeywell's minicomputer business.

What doesn't make sense is to tease those users by stating that Honeywell plans to talk to those companies when the companies say no talks have begun, and Honeywell executives say they are not sure what types of agreements they want to discuss.

If Honeywell wants its Information Systems division to have a technology sharing arrangement with NEC and Bull, or wants the three companies to merge, or wants to sell the division, it would have been better to say so. That would have quashed rumors of an outright sale if all Honeywell wanted was to share technology with its long-time Japanese and French partners.

Such openness would have made it easier for customers to feel confident that their vendor was being forthright and plans to stay in the computer business for years to come.

Instead, the analysts and the customers could only assume that Honeywell may make the most drastic moves possible. What does that mean for the customers, employees and investors? It means a lot more questions remain to be answered.

DEC releases VAX drive

From page 19

a terminal server with a local statistical multiplexer.

The Decmux II acts as the remote statistical multiplexer, providing the network interface for devices at the remote site.

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BETTER PERFORMANCE

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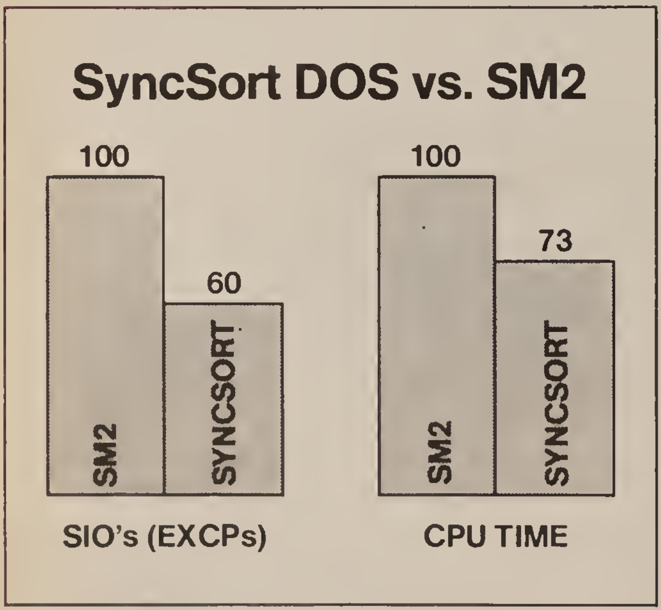

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SOFTWARE & SERVICES

SOFTLINE
Thomas O'Flaherty

PC-mainframe systems far off

For many, perhaps most, application planners, micro-mainframe systems always seem a distant dot on the horizon — no matter how far we travel, the dot never seems any closer. Is it just a mirage?

First of all, exactly what does this dot consist of? One of the problems in discussing micro-mainframe issues is that few people agree on exactly what they are. Based on my experience, a realistic description of a micro-mainframe application is that it involves a useful, reproducible exchange of data or processes between a host computer and a microcomputer. This eliminates, unfortunately, much of what passes for micro-mainframe work today. Experiments, "hand-crafted" transfers, uncontrolled and nonsecure exchanges are not included.

This may seem to be arbitrary or too restrictive. However, considerable research has shown that micro-mainframe applications must be both robust and at least potentially routine to be useful in a business setting.

End users, many of whom hold important positions, have been led to believe that these kinds of micro-mainframe applications are much closer to reality than is usually the case.

These heightened expectations are partly of end users' own making. They have, by and large, found personal computers both easier to use and more useful than they first thought. All that they see in a micro-mainframe link is

See **PC** page 30

O'Flaherty is a principal of Information Service Strategies, Inc., a Wood Ridge, N.J., consulting firm.

Enhanced All-In-1 debuts

Document features added,, E-mail system revamped

By Charles Babcock

MAYNARD, Mass. — All-In-1, Digital Equipment Corp.'s popular office automation system, has been enhanced in a version with more document processing features and a more open electronic mail system.

Version 2.1 is available immediately at prices that range from $4,500 for DEC's desktop, the Vaxstation II, to $67,500 for the VAX 8800. Prior to Version 2.1, a separate version of All-In-1 ran under MicroVMS on the Microvax series; now one version runs across the VAX family of computers, including clustered VAXs, DEC spokeswoman Denise Ferbas said.

WPS-Plus, DEC's document processing system, is standard in Version 2.1 and provides advanced editing features and automatic functions, such as number of paragraphs and footnotes and production of form letters.

Decspell (a spelling checker), a word usage alert and an electronic thesaurus are also standard features, Ferbas said.

Version 2.1 also includes DEC's Message Router, which includes VMSmail Gateway services to allow the exchange of messages with other VMSmail and All-In-1 users. An optional X.400 gateway allows All-In-1 to exchange mail with systems using the X.400 standard.

Tools to customize All-In-1 menus and forms to fit specific business needs are included. The Microvax All-In-1 Generator Kit has also been included in the package. It allows systems programmers to integrate business applications into All-In-1 on a central development system. The customized applications can then be deployed to All-In-1 Microvax systems, a DEC spokesman said.

In large departments, a fully configured All-In-1 VAX 8550 package will reportedly support up to 300 people performing a typical mix of office applications, DEC

See **ENHANCED** page 32

Performance up in Ingres 5.0

By Eddy Goldberg

ALAMEDA, Calif. — Relational Technology, Inc. has announced the immediate availability of Release 5.0 of Ingres, its relational data base management and application development system.

Primarily a performance release, Ingres 5.0 has demonstrated 30% to 40% performance gains for complex queries and up to 50% for transaction processing applications over Release 4.0 in user beta tests, according to a company spokesman.

Hardy Reinert, data administrator at the Canadian firm of MacDonald Dettwiler & Associates Ltd. in Richmond, British Columbia, corroborated Relational Technology's claims with his own beta tests of Ingres 5.0 against Ingres 4.0. Reinert explained he fine-tuned Release 5.0 and

See **PERFORMANCE** page 32

Resource manager for VAX permits flexible chargebacks

By Charles Babcock

RIVERDALE, Md. — A new version of Arsap, a resource management system for the Digital Equipment Corp. VMS operating system, can generate reports for a VAX cluster or a specific node, Gejac, Inc. spokesmen said recently.

In addition, a beta-site user of the product says it allows him to do chargeback billing on a project as well as individual user basis.

Gejac of Riverdale is a 9-year-old supplier of software to the PDP-11 and VAX marketplace. Its Arsap package has an installed base of 500 licenses, Gejac spokesman Gregg E. Church said.

Arsap produces billing reports that al-

See **RESOURCE** page 32

INSIDE

McDonnell Douglas Information Systems Group enhances its CAD/CAM and factory floor software/**28**

IBM announces MVS and VM CAD/CAM packages/**28**

NEW THIS WEEK

- Syncsort upgrades Syncsort CMS
- For more on this and other new products, see pp. 123-151.

INSTANT ANALYSIS

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McDonnell Douglas bolsters CAD/CAM software line

By Rosemary Hamilton

CHICAGO — McDonnell Douglas Information Systems Group beefed up its computer-aided design and manufacturing (CAD/CAM) and factory floor software products with a number of announcements at the recent International Machine Tool Show held in Chicago.

The St. Louis-based company released a new version of its Unigraphics II CAD/CAM software for large and mid-range systems and announced that the software will be available on the Digital Equipment Corp. Vaxstation II/GPX workstations, for which McDonnell Douglas recently signed an OEM contract.

The vendor also introduced enhancements for its robotics software, Place, which runs on the DEC VAX line of minicomputers, and said it had ported its factory floor communications product to the IBM PC Series/1.

Features added

Unigraphics II includes a number of new features, such as surface trimming, that have been added at no additional cost to users with maintenance contracts. The software, which starts at $50,000, runs on IBM systems operating under VM/CMS, all DEC VMS systems and Data General Corp. minicomputers.

In addition, three interfaces to third-party software packages have been added to Unigraphics II, including one for Interleaf Corp. technical publishing software. McDonnell Douglas will offer users the third-party software and interface as a complete package.

The vendor plans to market five bundled Unigraphics II systems based on the DEC Vaxstation II/GPX workstations. Prices will range from $50,000 to $70,000.

Software to be included

The packages include the CAD Assistant/GPX, the CAE Assistant/GPX, the Machine Design Assistant/GPX and CAM Assistant/GPX. A spokesman said the vendor will not provide software separately.

Plantcom, a factory communications package that was designed for the IBM Series/1, is now available on the IBM PC Series/1. It will sell for $20,000. A portable, hand-held terminal that ranges in price from $2,000 to $6,000 was introduced for Plantcom. It allows users to collect data at remote areas of a factory.

Two features were added to the Place robotics software; they will be provided to users at no extra cost if they are under a maintenance contract. The software now allows simultaneous motion of two or more devices within a work cell and provides automatic collision detection of robots or other devices working in a cell.

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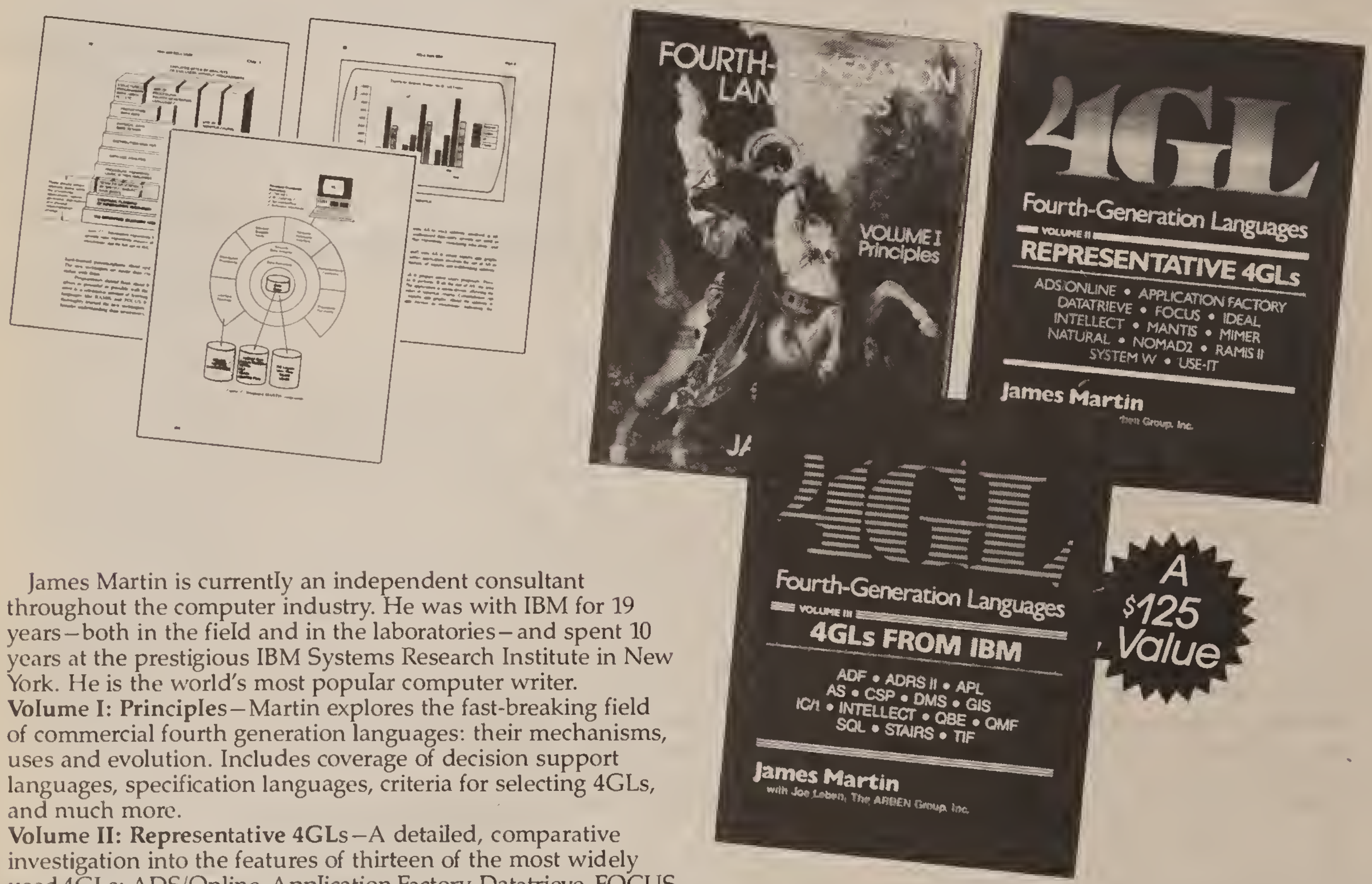
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Computer World 10/6/86

IBM adds CAD tools

By Rosemary Hamilton

WHITE PLAINS, N.Y. — IBM recently announced two computer-aided design and manufacturing (CAD/CAM) software packages for systems running under its MVS and VM operating systems.

Cadam Interactive Solids Design Release 20.1 is an extension of the Cadam line of CAD/CAM tools. The base Cadam package, designed by Cadam, Inc. of Burbank, Calif., is marketed by IBM for its large systems as well as low-end systems such as its RT Personal Computer. The new solids modeling package, also designed by Cadam, has a starting price of $30,500, IBM spokesmen in White Plains said.

Two other Cadam products, the Interactive Design Version 2 and the Geometry Interface, are required to use the Interactive Solids Design package. Interactive Design Version 2 can be paid for with a one-time charge, which starts at $70,000, or on a monthly license basis that starts at $1,710. The Geometry Interface costs $24,000, IBM spokesmen said.

IGES processor added

IBM also introduced a new version of its Initial Graphics Exchange Specification (IGES) Processor. IGES is a standard for exchanging computer graphics data approved by the American National Standards Institute. The IBM product is an implementation of the third release of IGES. IBM's IGES Processor Release 3, which has a one-time charge of $26,600, is designed for graphic data exchange among IBM CAD/CAM systems. It formats data into IGES standard files, which can then be sent among users, company spokesmen said.

The Interactive Solids Design package is made up of a solids modeler that assists the user in creating solids designs; an advanced analysis module that analyzes the data produced by the modeler; and an advanced imagery module that is used to view and edit designs, IBM spokesmen said.

The IGES package is available now, while the Interactive Solids Design software is scheduled for release Oct. 31, spokesman said.

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PC-mainframe systems far off

From page 27

what goes on the micro end. This seems to them so straightforward that they cannot readily imagine all of the problems that must be overcome to establish even a jerry-built micro-mainframe link.

But the end users are not alone in having misjudged the micro-mainframe environment. MIS departments have, for the most part, taken a low profile when it comes to micro-mainframe activities. About as low, in fact, as they took during the analogous takeoff period of the personal computer. An unaggressive micro-mainframe position may be even more damaging than was the case with PCs.

This is not to say that MIS departments should blindly charge ahead, setting up numerous micro-mainframe applications. There are serious problems that must be addressed before this will be possible.

Barriers not understood

However, research indicates that these potential barriers are not sufficiently appreciated. Consequently, planning and action stand a good chance of being ineffective or even counterproductive.

There are two areas in which greater understanding is necessary — the very technical and the not-so-technical. They are equally important.

The not-so-technical is fuzzy at this stage, but may ultimately become the most important. Briefly, it involves MIS and user departments achieving a common understanding of generic micro-mainframe applications that could solve specific business problems. There are few detailed guidelines available yet and nothing in the way of packaged solutions. That is why the emphasis must be on the generic.

In some cases in which the risk/reward ratio is attractive, an actual micro-mainframe application might be put together. In most cases, though, such study will only identify the key roadblocks. As these roadblocks are pushed aside, or ways are found around them, an increasing number of micro-mainframe applications will become feasible.

Many roadblocks will involve basic analysis. We are not used to thinking of systems that have true multilocational data and processing. These conceptual voids apply at least as strongly to MIS workers as to end users. Micro-mainframe applications will be found to be much more than terminals with storage or PCs that can import data from other locations.

In the short run, though, the technical roadblocks may seem much more daunting, partly because they are so obvious. Perhaps a more important reason is that most of those involved with micro-mainframe planning in larger organizations will have a technical orientation.

The three interrelated types of technical roadblocks are data base linkage, data transfer and multiprocessing on the PC.

The long-term goal in data base linkage is transparency. The geographic location of a piece of data should be of no concern to an application. This, by the way, is the intuitive expectation of end users.

Transparency far off

We are obviously a long way from this in spite of intriguing progress being made by Oracle Corp., Relational Technology, Inc. and CCA Uniworks, Inc., among others. It is unlikely that we will see large-scale, routine transparency implementations before 1990.

At the opposite end of functionality lies the mass of today's micro-mainframe products, which essentially allow previously selected data fields to be rather laboriously sent back and forth from the mainframe to the micro hardware and software environments. It is no

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coincidence that the vendors of such products have had very disappointing sales.

In the middle of the spectrum are a few commercial products, like Focus from Information Builders, Inc. in New York, that permit a common data and procedural environment on both the mainframe and micro ends of the micro-mainframe link. While not a true transparency, this does allow certain data linkages to be established more easily. Focus's use in a micro-mainframe setting is still at an early stage.

The ability to establish central control will be at the heart of future micro-mainframe systems. Without central data control, there can be no effective control over data structure or enforceable security. These may seem like extreme statements until you compare today's very minimal CICS security with that of even a good personal computer-based application.

Considering backup, recovery, interception and authorization, the failings of personal computers are worse than those ofhost-based systems.

LU6.2 to be standard

In principle, there are no more problems with data transfer. We'll just "let LU6.2 take care of it." IBM will make LU6.2 a standard. LU6.2 will also no doubt become the basis for other IBM-inspired micro-mainframe foundations in due course.

However, much more will be required than just a generic interface standard. A few firms, such as Rabbit Software Co., Systems Strategies, Inc. and Communications Solutions, Inc., already offer LU6.2 packages.

This is just the tip of the iceberg, however, when it comes to constructing applications. No applications vendor, for example, has said anything publicly yet about its future direction concerning LU6.2, which makes users' planning a good deal harder.

Applications design

Specific applications design in an LU6.2 environment will be very different from that in a terminal environment. How much will depend on what is attempted — or, in some cases, what can be usefully imagined.

Even a brief discussion of transparent data bases and uniform data transfer has to assume that there is something on the personal computer end that can handle the structured data arriving via the uniform interface. To date this has not been a realistic assumption.

If there is a dirty little secret in current micro-mainframe activities, it is that such links essentially take over the whole PC. This has not seemed a very high price where the alternative is manual key entry from computer printouts. But it is neither attractive nor feasible where ongoing coprocessing is an application requirement.

Problem lies in MS-DOS

This is not just a hardware limitation. The IBM Personal Computer AT series is about as limited as the IBM PC XT series in this respect. The problem lies in Microsoft Corp.'s MS-DOS itself. Some rumors about the characteristics of the future MS-DOS imply that concurrent processing will be possible.

It is quite likely, though, that we will have to wait for software targeted at Intel Corp.'s 80386 chip before there is effective multiprocessing. This means a wait until at least 1987 or '88.

These technical barriers are also milestones. That is, as additional developments occur, the true face of micro-mainframe linkages will become more apparent. However, if the time estimates given above are anywhere near reality, many micro-mainframe applications will not be feasible for several years.

This will put many MIS departments between the rock of user perceptions and the hard place of technical reality. Escaping alive will require a concrete sense of business needs and successive technical fallback positions.

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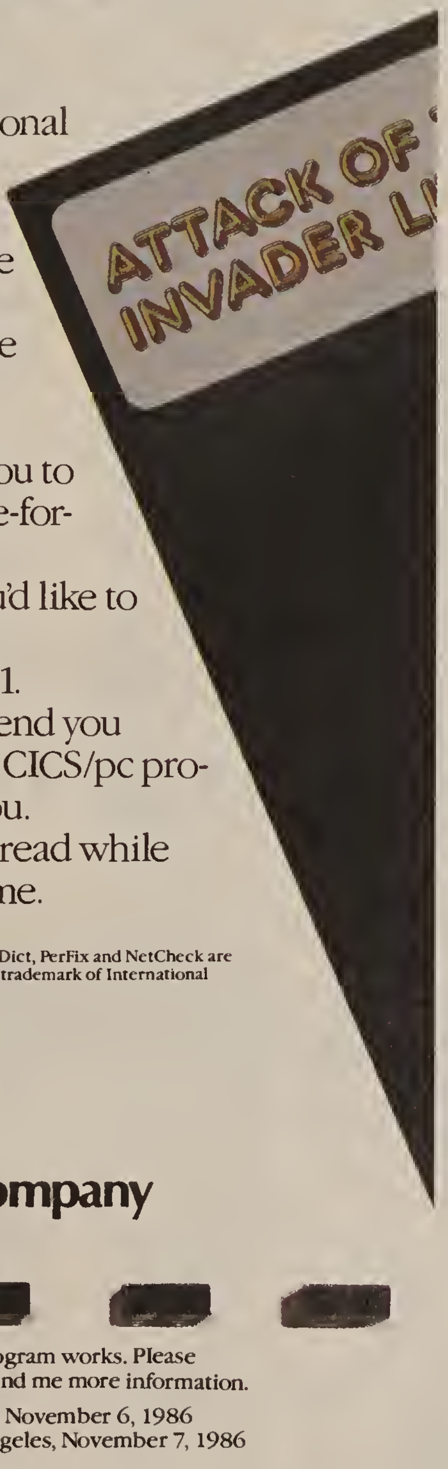

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Resource manager for VAX released

From page 27

low users to monitor system usage and chargebacks for all resources used on the computer. It can be used to control day-to-day operations, to monitor system utilization and growth and to set priorities in processing demands, Church said.

Arsap utilities have been rewritten in Version 5.0 to include a Digital Command Language (DCL) interface in addition to a previously available menu-driven interface.

"Menus look very flashy, but after you've gone through them two or three times, they just consume time," said John E. Vilandre, senior assistant programmer at the University of Minnesota in Minneapolis.

Vilandre, who used the previous version of Arsap on a PDP-1170 prior to converting to a VAX 8600, said he can now write DCL statements that automatically execute the steps of the menu in batch mode, eliminating the need for a systems operator to go through the menu to generate a monthly report.

Storage limits can be assigned by user or by project under Version 5, allowing a system manager to control the amount of storage used. In a cluster, the limits can be enforced clusterwide, Church said.

Arsap is available Nov. 1 for $4,995 on the VAX, with a charge of $999 for additional copies used in a VAX cluster. The Microvax version is $2,495 for the first copy and $998 for cluster copies. Version 5 runs on the entire VAX line, spokesmen said.

Vilandre said Arsap takes advantage of data collected by VMS in monitoring its own performance and executes reports on them. Another prime feature of the new release, he said, is its ability to report on system usage by project as well as individual user. "We have people who work on more than one project," he noted. They can switch from one project to another and have the chargeback allocated to the right project without logging off the system.

A feature that is still lacking in Version 5, he said, is the ability to charge back by both user and project. He has suggested to Gejac that such a feature be included in a future Arsap release, he said. "Gejac has been very responsive" to development suggestions and requests for product support, according to Vilandre.

Enhanced All-In-1 adds features

From page 27

spokesmen said.

Decnet VAX is needed for a clustered VAX operation, they added.

DEC also announced that the Digital Software Information Network is now available to All-In-1 service contract customers. Customers can log onto the data base to scrutinize product information, get answers to product questions and submit software performance reports. The service operates 20 hours a day, seven days a week, company spokesmen said.

The 4-year-old All-In-1 package holds 26% of the market for minicomputer-based office automation systems, according to figures from Framingham, Mass.-based International Data Corp. (IDC) cited in the Oct. 13 issue of *Fortune* magazine. IBM's Distributed Office Support System has 17% of the market, IBM's Profs has 10%, and Hewlett-Packard Co., Data General Corp. and Sperry Corp. each possess 12% of the market, according to the IDC figures.

Lee W. Doyle, senior communications analyst with IDC, said All-In-1 is the system of choice by 26% of the users of office automation systems. In terms of software licenses, All-In-1 represents 20% of the market.

The rapid growth of All-In-1 use reflects the high number of Microvaxes being shipped, many with All-In-1 on them, Doyle said. Although the number of licenses is increasing, the number of users per license is decreasing, because a Microvax supports between eight and 16 users, compared with 200 users on a VAX 8600, he added.

Performance up in Ingres 5.0

From page 27

was very pleased with the results.

In a test using the QUEL query language, Reinert did a retrieval to extract about 4,000 rows from a 60,000-row table and connect those rows to four other tables. He found CPU use only marginally higher, but elapsed time was down about 30%.

Reinert said two areas of noticeable improvement are in the B-tree storage structures, an indexing methodology for getting at a large file quickly, and in the use of a Repeat query operation in a program.

In a transaction process test, he implemented a Repeat append in an Embedded QUEL/Pascal program for time-sheet data. "For an append operation with one master row and 12 detailed rows, the CPU requirement was cut in half," he reported.

Relational Technology claims Ingres Release 5.0 is fully compatible with Release 4.0 and contains all its enhancements. It is also said to contain enhancements that improve communication with the company's distributed data base, Ingres/Star.

Release 5.0 is available for IBM VM/CMS, Digital Equipment Corp. VAX/VMS and Unix operating environments. It is priced from $3,000 for the DEC Microvax to $140,000 for IBM mainframes.

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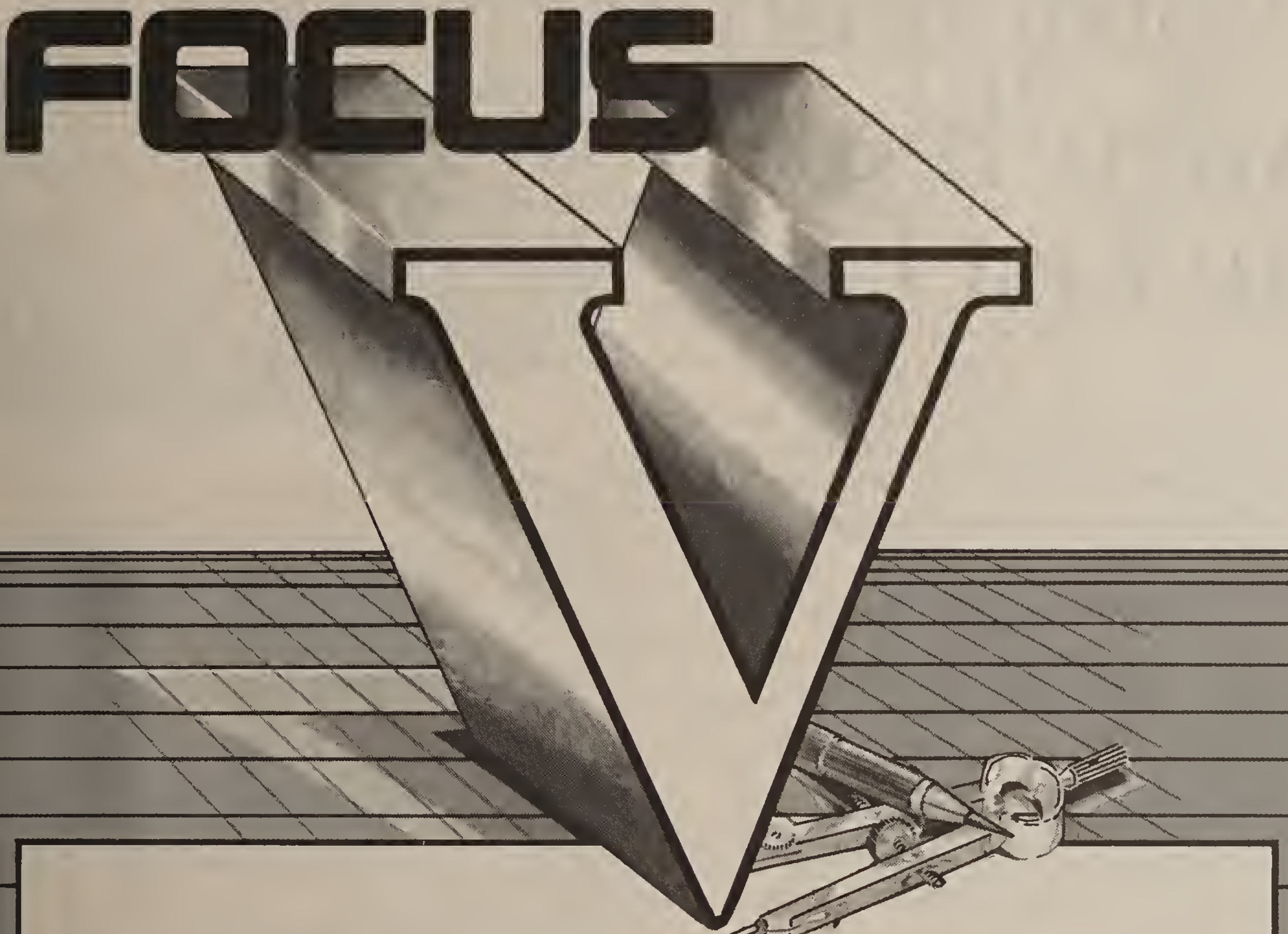

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1986 Fall Seminar Agenda

8:30- 9:00	Registration and continental breakfast
9:00-10:00	FOCUS for Data Analysis Applications
10:30-10:45	Refreshment break
10:45-12:15	FOCUS for Database/Data Management Applications

1986 Fall Seminar Schedule

Atlanta, GA Tue Oct 14
Hyatt Ravinia, Atlanta
Austin, TX Wed Oct 22
Stephen F Austin Hotel, Austin
Baton Rouge, LA Tue Oct 14
Embassy Suites, Baton Rouge
Boston, MA Thu Nov 6
Boston Marriott, Newton
Charleston, WV Thu Oct 16
Charleston Marriott
Chicago, IL Tue Oct 28
Marriott Oak Brook, Oak Brook
Chicago, IL Thu Nov 6
Westin Hotel, Chicago
Cincinnati, OH Thu Oct 30
Hyatt Regency, Cincinnati
Cleveland, OH Thu Oct 23
Cleveland Airport Marriott
Danbury, CT Tue Oct 28
Danbury Hilton Inn
Detroit, MI Thu Oct 16
Michigan Inn, Southfield
Detroit, MI Tue Nov 18
Somerset Inn, Troy
Greensboro, NC Mon Oct 20
Greensboro High Point Marriott
Hartford, CT Thu Oct 9
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Houston, TX Thu Oct 9
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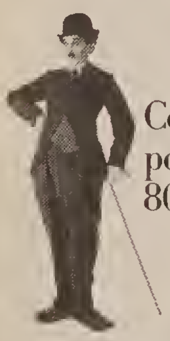

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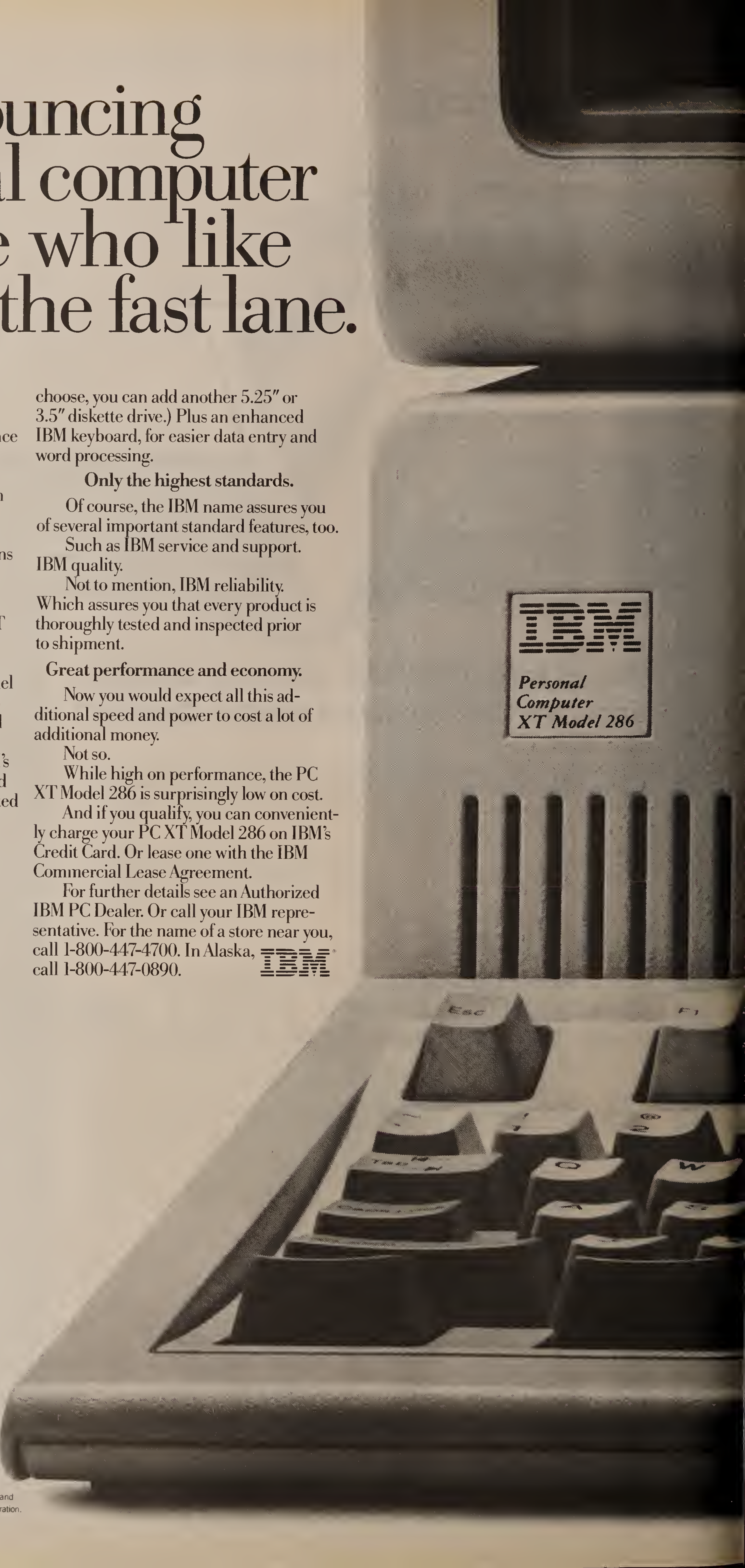

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COMMUNICATIONS

DATA STREAM
Daniel Minoli

Putting video on desktops

Ever since AT&T introduced the Picturephone at the 1964 World's Fair, the video workstation market has been trying unsuccessfully to take off. One major barrier to customer acceptance has been the high cost of equipment. Video coders and decoders that interface full-motion video workstations with communications channels cost $60,000 and up. Another obstacle has been the scarcity or downright unavailability of 56K bit/sec. digital data services that can support full-motion video transmission.

But now, converging technological trends may finally provide many companies with an affordable way to bring videoconferencing to users' desks. The price of video coders and decoders shows signs of declining. At least two relatively inexpensive, full-motion video workstations have appeared in the last few months.

And AT&T's aggressive push toward providing Integrated Services Digital Network (ISDN) services should ensure greater availability of 64K bit/sec. channels that are needed to support full-motion video.

In March, Pictel Corp. of Peabody, Mass., began a videophone system that incorporates the company's video coder/decoder and Datapoint's full-motion video workstation, Minx. The system operates over digital lines with at least a 52K bit/sec. capacity. A five-

See **PUTTING** page 42

Minoli is an adjunct assistant professor with New York University's Information Technology Institute as well as a full-time data communications researcher and strategic planner.

MCI plans global network

Unveils Base-1 network management service

By Elisabeth Horwitt

SAN DIEGO — Targeting international corporations with a need for reliable, high-speed communications, MCI Communications Corp. said recently that it will provide dual satellite and optical-fiber links around the globe.

Provided jointly with overseas carriers, such as British Telecommunications PLC, the network is geared to "international brokerage firms and other companies that needed high-speed, reliable communications with branches overseas," said Steven Mott, MCI's international vice-president of sales and marketing, at the Telecommunications Association (TCA) '86 conference held here recently.

The first overseas leg of the network will be a satellite-based link via Intelsat Business Service and TAT-8 fiber-optic trans-Atlantic cable, slated for delivery in July of 1988.

MCI customers on the East Coast pay $4,000 a month for a 56K or 64K bit/sec. link; they pay $40,000 a month for a 1.5M bit/sec. link. Pricing for the European end of the link is additional.

Through agreements with British Telecommunications and General Directorate Telecommunications of France, MCI provides satellite links to Japan. This is the only part of the network that does not include a fiber-optic link. The network will then extend, via satellite and optical fiber, from Japan to Hawaii and across to the West Coast of the U.S. The Japan-U.S. satellite link should be operational by December, MCI said.

MCI also announced Base-1, a service that provides customers with a central data base of call-accounting information, plus high-level diagnostic alarms for multivendor private branch exchange (PBX) installations. The product targets "MCI customers supporting multivendor, multilocation, multiservice networks, who need

See **MCI** page 43

AT&T works in progress shown

By Elisabeth Horwitt

SAN FRANCISCO — Wideband packetized voice, a voice response system that gives directions, and an optical-fiber circuit-switching system are among the experimental technologies on display at Network of the Future, AT&T's technology showcase that opened its doors to customers last week. The exhibit will remain open at least through January 1987. While the technologies are among the most promising currently being researched at Bell Laboratories, AT&T would not say when — or even whether — they will eventually become available to customers.

Fastpack, a technology tentatively slated for introduction in the 1990s, is a system that converts voice, video and data transmissions into packets that can be sent

See **AT&T** page 43

Wideband links, T1 net management prevail at TCA show

By Elisabeth Horwitt

SAN DIEGO — T1 network management, a dominant theme at many of this year's communications trade shows, played a major role at Telecommunications Association (TCA) '86, which was held here recently.

The subject came up at the press briefing where Digital Communications Associates, Inc. and Cohesive Network Corp. announced the finalization of their merger. DCA product manager Joseph Rosenthal acknowledged that integrating the two companies' network management systems was a top priority for the merger.

A low-level interface demonstrated at TCA allowed users to call up Cohesive's

See **WIDEBAND** page 46

INSIDE

Charles River Data Systems to support TOP in Universenet release/**39**

NEW THIS WEEK

- David Systems adds distributed data networking feature to its David Information Manager
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TOP supported by Charles River LAN release

By Rosemary Hamilton

FRAMINGHAM, Mass. — Charles River Data Systems, Inc. recently announced that it would fully support the Technical Office Protocol (TOP) in the latest version of Universenet, a proprietary local-area network that links the vendor's workstations.

TOP is a set of emerging networking standards for the office environment that is based on the International Standards Organization's Open Systems Interconnect (OSI) seven-layer model. It has been slated as the office equivalent of the Manufacturing Automation Protocol (MAP), which is also based on the OSI model.

Lacks widespread support

However, TOP has not yet received the widespread support that MAP has gathered, according to industry observers.

"TOP is given lip service, but right now it isn't an overriding issue in users' purchase decisions," said Andrew Clark, a consultant with Houston-based Walter Ulrich Consulting, a division of Coopers & Lybrand. "They figure that, rather than buy TOP-conforming products from Charles River today, they can still purchase hardware from big-name vendors and be assured that they'll support TOP in the future."

> **”**
>
> ***'TOP is given lip service, but right now it isn't an overriding issue in users' purchase decisions.***
>
> — Andrew Clark
> Walter Ulrich Consulting

Charles River said Universenet 3.0, which is currently available at a price of $1,500 per node, is based on the TOP specifications that have been defined and on its own specifications, for such functions as a distributed file system and remote execution, which have no clear TOP definition at this time.

Will adopt standards

The vendor plans to adopt TOP standards as they become firmly established, said Richard Swee, product marketing manager. Charles River also plans to support the X.400 message handling standard in a future release of Universenet.

A number of vendors have announced their support of X.400, approved by the Consultative Committee on International Telephony and Telegraphy in 1984, but few have introduced products that support it.

"If we waited until all the standards get done, we'd have to wait until the year 2000," Swee said. "The key is the ability to migrate to standards. We've made a commitment to that, so there's no reason to wait for a TOP implementation."

Universenet 3.0 also conforms to MAP 2.1 standards, as did Version 2.0.

Low cost per line claimed for data switch

By Elisabeth Horwitt

GOLETA, Calif. — A data private branch exchange (PBX) unveiled by Comdesign, Inc. at the recent Telecommunications Association show in San Diego brings terminal-to-host connection prices down to $80 per line, the company claimed. The CX1500 Desktop Data Switch handles up to 144 asynchronous lines at 9.6K bit/sec.

In addition to providing dedicated terminal-to-host circuits, the data PBX can provide contention-based host access so that ports can be shared by a larger number of terminals, noted Comdesign product line manager Ronald Jeffries.

"When a group of terminals are only in use about an hour a day, for word processing and electronic mail, it's usually all right to have twice as many terminals as ports," Jeffries said. The CX1500 provides 75 classes of access that can be prioritized by individual, group or size of job, he added.

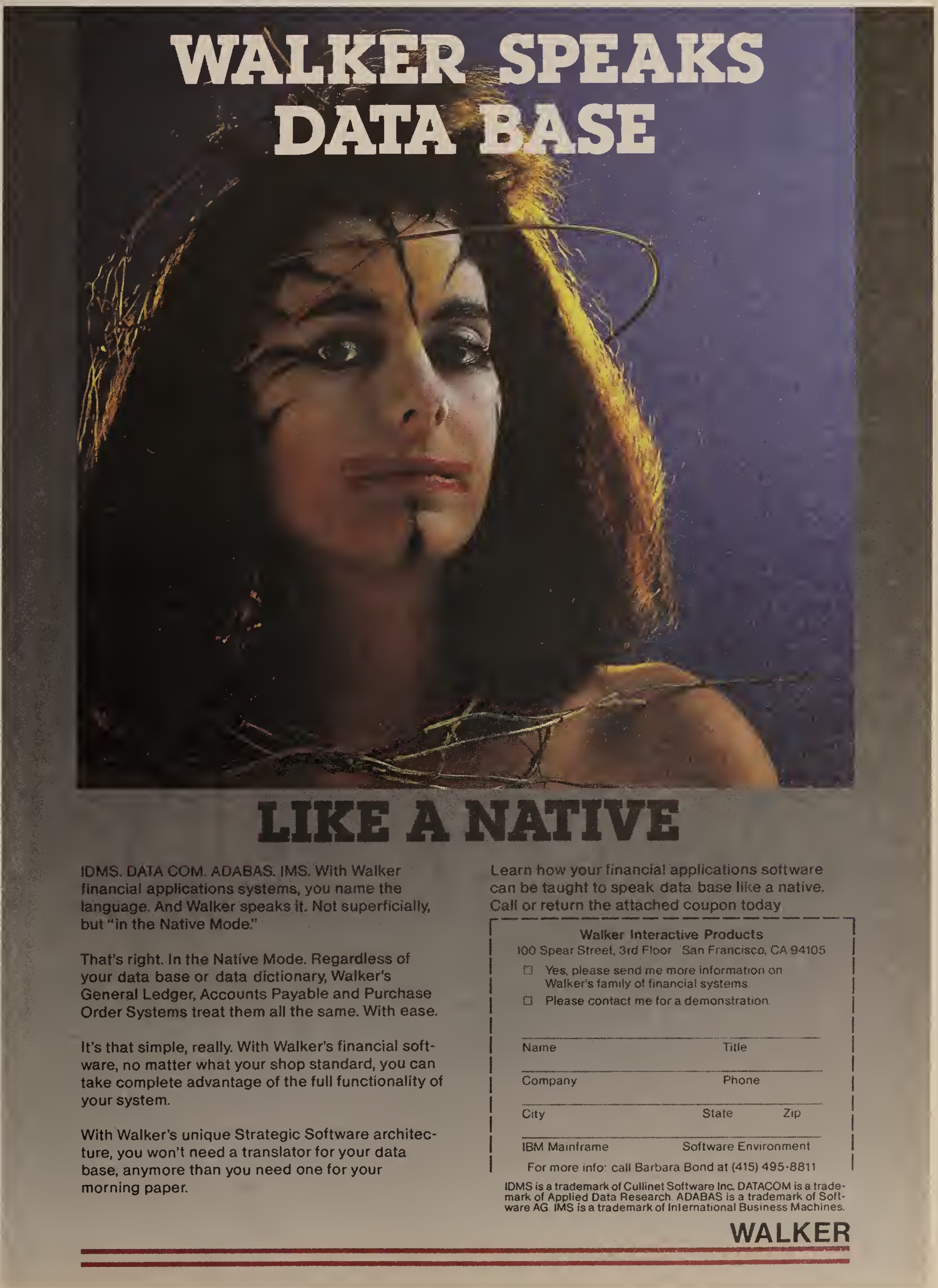
An optional redundant control set provides backup operations when the primary control set fails.

The CX1500 targets a broad segment of customers, Jeffries claimed. "Our market analysis shows that the average PBX installation supports 150 lines," noted Jeffries. He added that the CX1500 switch's cards can be reused by customers who want to migrate to Comdesign's high-end CX3000 chassis.

For the first 12 months after its release, Comdesign will give the CX1500 a $500 trade-in value for customers moving up to the larger CX3000 switch, which supports up to 408 lines, the company said.

The switch competes head-on with the DS5 data PBX from Equinox Systems, Inc., Jeffries said. "We took advantage of very large-scale integration and designed the system so that two logic boards can do what it takes three boards to do on our leading competitor's switch," he noted.

The entry-level 72-line CX1500 system retails for $7,600. The 144-line configuration costs $11,500, or $80 per line.



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Putting video on desktops

From page 35

workstation configuration with video coders/decoders costs $150,000.

At the recent Telecommunications Association '86 conference in San Diego, Videotelecom Corp. of Austin, Texas introduced Visionplus, an IBM Personal Computer-based system that provides full-motion color video, graphics, data and voice transmission.

A typical configuration costs only $5,900, but it requires a video coder/decoder. One coder/decoder can support multiple video workstations — either providing video-based communications between one pair of users at a time — or link a group of workstations into a single videoconference.

"For video workstations to go forward, we need universally available 56K bit/sec. lines, and for the high cost of video coders/decoders to be resolved," says Edward Enochs, Videotelecom director of marketing and sales support.

Several developments should bring video coder/decoder prices down in the next two to three years. The implementation of standards, along with very large-scale integration technology, should result in significant cost savings for manufacturers. And a recent influx of new competitors in the video coder/decoder arena should ensure that vendors pass on whatever savings they realize to customers.

Right now, companies start by paying $120,000 and up for the two video coders/decoders needed for a two-way video link. And this price tag does not even include the cost of the link itself.

The faster a system processes information, the better able it is to track movement, since it must send new information over the link every time the picture changes. Over a low-speed connection, individual movements become a blur. Thus, the need for affordable, high-speed communications links to support videoconferencing over distances.

Until recently, dial-up 56K bit/sec. channels were scarce, leaving companies to buy their own dedicated point-to-point 56K bit/sec. lines or even direct fiber-based multichannel videoconferencing links. Both of these options tend to be quite expensive.

The availability of dial-up digital 56K bit/sec. lines is improving, however, with optical fiber's increasing contribution to the high-capacity digital carrier pool. Managers who have access to such offerings as AT&T's Dataphone Digital Service can now bring full-motion video conferencing into their offices in the same way that they access regular telephone services.

The catch is that dial-up video transmission services are still limited to certain regions. They should be more widely available as soon as ISDN is adopted by local and long-distance carriers.

AT&T claims that it will introduce generally accessible ISDN services by the latter part of 1987. Other carriers will take longer.

Industry proponents — communications services and equipment vendors in particular — are fond of predicting that ISDN will provide users with standardized, truly integrated voice and data communications applications delivered over the same channels to the same workstation.

But videoconferencing also belongs under the ISDN umbrella. If ISDN fulfills its promise as an industry standard, its digital 64K bit/sec., dial-up channels will become the pipelines for delivering video communications offerings such as AT&T's.

Unfortunately, many industry proponents do not see ISDN coming of age until the early 1990s. But even before ISDN becomes a reality, the video communications market should see significant growth.

Diagnostic tool debuts

By Elisabeth Horwitt

CALABASAS, Calif. — A diagnostic and trouble-shooting system geared to Integrated Services Digital Network (ISDN) was recently introduced by Tekelec.

The Chameleon 32 Protocol Test and Development System was designed to isolate and solve trouble spots on ISDN, CCITT X.25, high-level Data Link Control, Systems Network Architecture/Synchronous Data Link Control and bisynchronous/asynchronous environments.

"We designed the Chameleon 32 for communications professionals with a special emphasis toward ISDN," Tekelec director of marketing Robert Hess said. The Chameleon 32 can connect directly with either the 1.54M-byte or 2M-byte ISDN Primary Rate interface, enabling users to insert or extract information from any 56K or 64K bit/sec. time slot, the company claimed.

Based on a Motorola 68010 CPU, the system can keep pace with high-speed, high-density lines via a 144K bit/sec. capture buffer and 10M bytes of virtual memory. This permits users to capture enough data to troubleshoot intermittent problems, according to Tekelec.

Statistics displayed include line utilization, response time and message sizes.

The Chameleon 32 configurations start at $21,900.

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AT&T works in progress show

From page 35

over the same wideband network. This April, AT&T concluded a yearlong trial of a prototype Fastpack network in the San Francisco Bay area. During the trial, approximately 2,000 users sent voice, image and data transmissions to local AT&T Access Interfaces, which converted them into packets that could be transmitted over T1 links. While an ordinary 1.54M bit/sec. T1 link supports 24 64K bit/sec. voice channels, packetizing enables the same link to support up to 120 voice channels without noticeable degradation of quality, according to AT&T.

Richard Snowden, director of service concepts for AT&T's business marketing group, says that network channel utilization is five times more efficient than it is on traditional networks where voice and data are sent on different channels. This is partly due to the voice compression techniques used and partly because voice packetization eliminates the unused transmission time that represents silence in voice conversations, an AT&T spokesman says.

The Access Interface nodes balance data, voice and video networking needs to avoid unacceptable response time or voice-quality degradation, according to Snowden.

Fast packet technology probably will be incorporated into AT&T's network sometime in the 1990s, Snowden says. But first some problems need to be resolved. "We need to develop industry standards in that area; it doesn't help if your technology is too far ahead of everyone else's strategy," Snowden says.

In addition, AT&T must overcome technical barriers relating to overall network speed, he says. In a traditional packet-switching network, each node acknowledges a transmission before sending it on. "We want to eliminate those delays by putting the acknowledgment process just at the receiving node. That means increasing the speed with which nodes handle transmissions — putting it all in silicon, not software. Which makes it very important that we get the protocols right the first time," Snowden says.

AT&T is also working on user terminal phones and telephone sets that packetize transmissions at the customer's premise. While prototypes exist, "even a Fortune 500 company would not be able to afford them," an AT&T representative says.

Also appearing at AT&T's showcase is a voice response system that analyzes sentence syntax in order to correctly interpret abbreviations and correctly insert pauses and pitch while reading a sentence back.

Bell Laboratories is still working on a voice response system that can understand human speech without having to learn a specific user's speech patterns. A visual system that records and analyzes lip parameters is one promising area of study, according to an AT&T representative.

Another AT&T exhibit demonstrates an experimental application of voice response, voice synthesis and artificial intelligence. The system interacts verbally with the user to plot the best route to a destination — and provides directions when the user becomes lost. Also on display is an experimental photonics switch that routes transmissions directly from one optical fiber to another.

"The bottom line with the Wideband Packet Technology, optical-fiber networking, photonic switching and even Integrated Services Digital Network technologies is that they drive down cost," says Joseph Baldini, AT&T district manager of marketing service concepts. "Historically, AT&T has passed on those savings to customers."

MCI plans new global network

From page 35

a better understanding of who is using what why," said Brian Thompson, president of MCI's mid-Atlantic division. Base-1 enables users to "gain a better handle on management" via real-time, customized reports of equipment and line installations," he added.

To be offered initially in MCI's mid-Atlantic region, Base-1 will provide reports on least-cost routing for various customer links, said Thompson. He admitted that the service would "not be absolutely accurate" in its cost data.

Base-1 will interface with call accounting systems from Moscom Corp. that are currently installed in some 85 to 90 PBX products, a Moscom spokesman said. MCI is also working with one divested Bell operating company to interface the system with the carrier's Centrex call-accounting system, MCI said.

The service will also poll customers' PBX installations for high-level fault alarms and send alarm information on to a designated terminal or printer or even call the network manager at home, Thompson said.

"Call accounting is a big user concern," said Prince Dyess, director of telecommunications for Scripps Clinic and Research Foundation and president of the TCA. "If MCI's service works, it could be very useful."

However, Dixon Doll, chairman of Ann Arbor, Mich.-based consulting firm DMW Group, Inc., pointed out that users should be wary of depending on one carrier to provide complete least-cost routing information on other carriers' offerings. "If I were a company, I would want to control my own network," Doll said.

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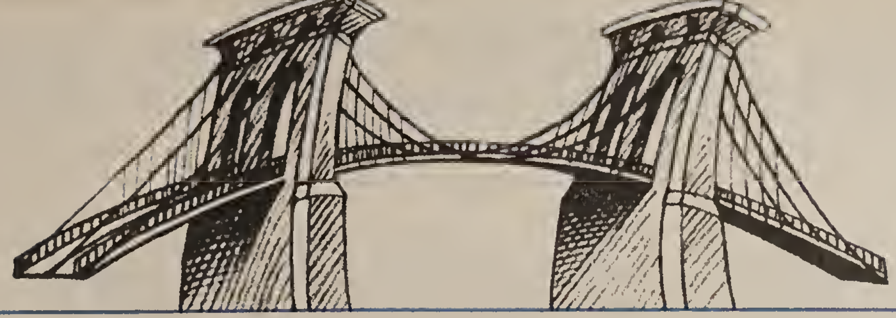

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After carefully weighing all the evidence, Shearman & Sterling reached a unanimous verdict. Wang VS, Wang PCs and WangNet offered a system that none of their 450 attorneys could object to.

4. Grumman Corporation is one of the leading manufacturers of aircraft and aerospace systems. Their size and scope placed a tremendous demand on their professional programmers, who were faced with developing applications for each of Grumman's different departments.

Wang offered an effective solution—the Wang VS and Professional Application Creation Environment (PACE). Now for the first time Grumman's non-technical employees are able to develop their own sophisticated applications. And professional programmers are free to work primarily on applications that require their special expertise. Which means that no one at Grumman has to sit around waiting for something to happen.

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Wideband links at TCA

From page 35

network management system on a window of DCA's network management workstation. The two companies are already working toward higher level integration of the two systems, which would allow users to manage both sets of networking products from one workstation and one data base, Rosenthal said.

"We're in the process of rewriting the network management system entirely, so you can run it on a range of systems, from a personal computer up to a VAX, and add features in a modular fashion," he said.

Both DCA and Cohesive indicated that they have already begun working on interfaces with IBM's Netview network management system, although no time frame for availability was announced.

DCA also announced at TCA its 24/24 Support Services program, which provides qualified customers with 24 months of free remote diagnostics and maintenance. A third DCA announcement was the Digital Packet Exchange (DPX) family of CCITT X.25 packet assembler/disassemblers.

The DPX-100 connects up to 64 asynchronous devices to a packet-switched network service or DCA communications processor at speeds of up to 19.2K bit/sec. Priced at $5,190, it will ship in November. The DPX 2100, which supports 80 asynchronous devices, is priced at $5,790 and will be available in January 1987.

Other announcements

Among other T1 and network management-related announcements made at TCA were the following:

- Data Switch Corp. introduced Model 3225 of its Intellinet series of network performance measurement systems. Designed to measure performance for very large IBM Systems Network Architecture (SNA) networks with thousands of distributed devices, the 3225 monitors each network device, application and transaction and displays trouble spots as coded graphics, the company said.

Data Switch also announced protocol monitoring for X.25 networks and the International Passenger/Programmed Airlines Reservation System/ALC (IPARS/ALC) airline reservation systems.

An Intellinet system based on the 3225 costs $45,000, including control processor monitoring of up to 32 lines, color and black-and-white CRT terminals, scan unit and printer.

IPARS/ALC and X.25 monitoring cost an additional $1,000 per line and will be available in January 1987. The 3225 is available immediately.

- Lee Data Corp. unveiled the T1 Communications Processor Model 525, which enables users of Lee Data remote SNA controllers and terminals with the ability to communicate with a host processor at 1.54M bit/sec. T1 speeds. Priced at $19,185, the Model 525 can concurrently support up to four T1 lines and four remote Lee Data controllers.

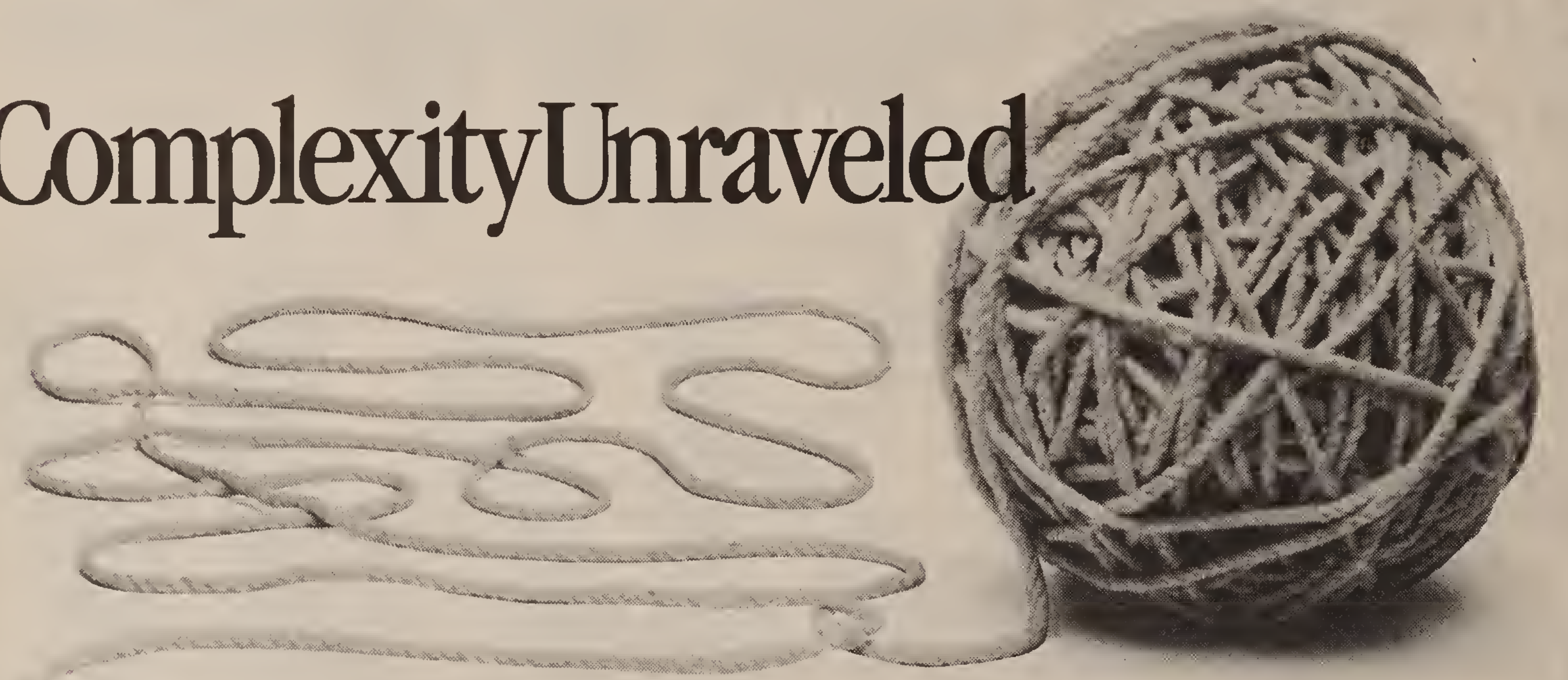
The Model 550 Interface Expander, also introduced at TCA, enables up to four Lee Data remote controllers to be connected to one T1 line. It is priced at $1,500. Both products will ship later this year.

Lee Data also announced X.25 support for its Series 300 3270 controller and series 400 3270/asynchronous controller.

- Infinet, Inc. announced the Integrated Diagnostic Modem (IDM) family. The IDM 2400, IDM 4800, IDM 9600 and IDM 14.4 are analog modems that perform nonintrusive diagnostics over unconditioned private lines. The IDM 500 and IDM 556 interface with, and perform diagnostics over, a standard Data Digital Service network. The IDM 500 transmits at 2.4K, 4.8K, and 9.6K bit/sec.; the IDM 556, at 56K bit/sec.

The IDM family provides remotely controlled dial backup and centralized trouble monitoring through Infinet's EMS-II Network Control System. They also interface with Infinet's Series 90 Network Information Systems.

Prices for the IDM modems range from $1,500 for IDM 2400 to $6,000 for IDM 14.4. The IDM 500 is priced at $1,895; the IDM 556 at $1,995. Some IDM units will be available in November and December, and others will become available early in 1987.



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Of course, IFPS/Plus includes comprehensive training for users, full documentation, "Hot Line" service and complete support. It's a package you'll only get from EXECUCOM, the leader in corporate decision support.

If you're not unraveling your business problems with IFPS/Plus yet, let us tell you why you should be. Give us a call at 1-800-531-5038 (in Texas, 512-346-4980, in Canada, 1-800-558-1390). Or write EXECUCOM Systems Corporation, 9442 Capital of Texas Highway, North, Arboretum Plaza One, Austin, Texas 78759.

EXECUCOM

MICROCOMPUTERS

SMALL TALK
William Zachmann

To the exotic land of AI

Far-off lands play an interesting and unique role in human psychology. Distant and unfamiliar places readily become a projection screen for our hopes and fears, aspirations and terrors. Even in the age of jet travel and electronic communications, this deep psychological tendency remains.

Artificial intelligence is an area of technology in which such fear is clearly evidenced. Foreign- and exotic-seeming even to many otherwise sophisticated information systems professionals, AI offers a prospect of remarkable "intelligent" systems somehow completely different from those with which we are already familiar.

There is no more effective way to gain real appreciation for distant lands than to travel to them.

Turbo Prolog from Borland International, Inc. is a useful product that offers the opportunity of extremely low-cost travel to the exotic land of AI. For the sum of $99.95, one obtains passage into the mysterious heart of AI territory, where one may examine at leisure the local life forms. More than that, however, Turbo Prolog is a powerful, practical and usable tool for those who master it.

Prolog (the name is derived from "programming in logic") and LISP ("form list processing") are the two dominant languages used in AI research and applications. Although until recently LISP has been more widely favored in the U.S. and Prolog has been

See **TO** page 58

Zachmann is vice-president of research at International Data Corp.

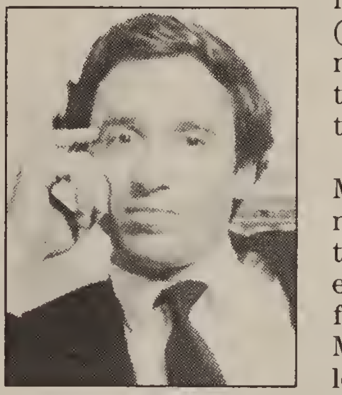
Manzi looks beyond Kapor to 1-2-3 future, age of MVP

By Douglas Barney

Lotus Development Corp. and its cofounder, Mitchell Kapor, have long been synonymous. But in July, when Kapor resigned as chairman, a new Lotus figurehead emerged.

Thirty-four-year-old Jim Manzi, former award-winning journalist, management consultant and father, now heads Lotus, the world's largest microcomputer software company.

Since last summer, Lotus has made two important announcements that place the company firmly in the world of MIS and data processing. The Application Connection (TAC), which was announced almost simultaneously with Kapor's resignation, allows personal computer users to extract data from mainframes and translates that data in a variety of PC formats. More recently, Lotus announced the Multi-Value Plan (MVP), which provides a means of removing copy protection and allows direct sales to large accounts.


Lotus's Manzi

In an in-depth interview, Manzi affirmed Lotus's commitment to working with MIS, talked frankly about the limited success of producing Jazz for Apple Computer, Inc.'s Macintosh, addressed the looming head-to-head competition with Microsoft Corp. and offered his personal goals for moving the company beyond 1-2-3.

CW: Are you planning any products for

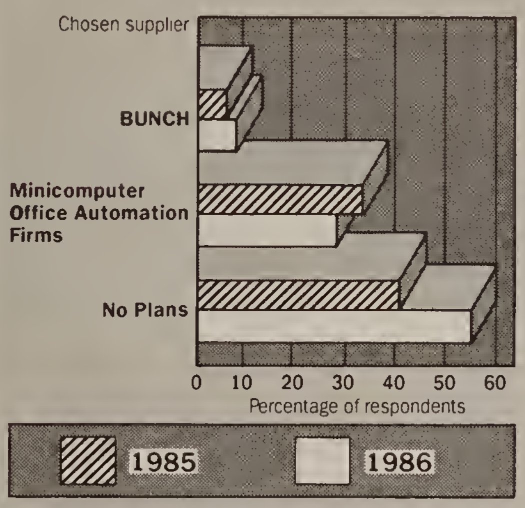
See **MANZI** page 52

DATA VIEW

MITCHELL J. HAYES

Fortune 1000

Intentions to purchase microcomputers from non-IBM mainframe and minicomputer firms



Information provided by Newton-Evans Research Co. and based on the response of 155 MIS and data processing executives in Fortune 1,000 firms.

Corpcon execs see software evolve as micros up power

By Peggy Watt

LOS ANGELES — A panel of microcomputer industry leaders, several of them software developers, said they look for artificial intelligence applications and other such memory-intensive programs to be among the first to take full advantage of the processing power of Intel Corp.'s 80286 and 80386 chips.

The panelists converged recently at the Corporate Microcomputer Exposition and Technical Conference, an industry trade show, and made a host of predictions.

According to some panelists, there are risks in exploiting the power and large address space of advanced microprocessors. "It could make for some sloppy software if we're not careful," said Philippe Kahn,

See **SOFTWARE** page 48

INSIDE

Wang announces discounts for its desktop systems, workstations and selected peripherals/**45**

NEW THIS WEEK

- Samna ports Samna Word III to Torus' Tapestry networks
- For more on this and other new products, see pp. 123-151.

INSTANT ANALYSIS

"I don't expect to totally displace Intel Corp. in the PC area, but at the same time, I don't believe that Microsoft Corp.'s MS-DOS is the operating system that people are going to use for office automation. I think it's Unix."

— Jack Browne, marketing manager for the Motorola, Inc. 68000 series, referring to the competition between the new 32-bit Motorola 68030 and Intel's 32-bit 80386.

Oracle's SQL★Calc makes a relational DBMS as easy as 1-2-3.

Oracle Corporation has developed a Lotus 1-2-3 compatible spreadsheet and integrated it with its ORACLE® relational database management system (DBMS). The new product, SQL★Calc,® is the first to combine a mainframe-class relational DBMS with an easy-to-learn and familiar PC spreadsheet user interface.

SQL★Calc is designed for 1-2-3 users who've run out of memory, flexibility and patience. SQL★Calc allows you to put SQL database commands into spreadsheet cells... just like formulas. This permits you to access large amounts of data directly from your spreadsheet.

Like all Oracle Corporation products, SQL★Calc runs identically on mainframes, minicomputers and PCs.

SQL★Calc's foundation is the ORACLE relational DBMS, which provides users with a complete set of SQL commands through which they can create, retrieve, modify and otherwise control their data. SQL is the industry standard database command language for large computers. The SQL commands available in ORACLE are identical to the SQL commands in IBM's premier mainframe relational DBMS products, SQL/DS and DB2.

Built on this powerful DBMS foundation is a Lotus 1-2-3 compatible spreadsheet that allows users to put SQL commands into spreadsheet cells in the same way as they enter formulas. When a SQL command for data retrieval is entered into a spreadsheet cell, information is automatically retrieved from the database and placed into the spreadsheet. SQL★Calc also permits users to modify the database–and even create new database tables–directly from the spreadsheet.

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SQL★Calc is easy to learn because its menu and command structure are compatible with those of Lotus 1-2-3. And SQL★Calc's ORACLE DBMS requires no supplement: It is vastly more powerful than the database components of 1-2-3, Symphony, Framework, dBase II, dBase III, or any other PC DBMS.

SQL★Calc is available immediately for IBM PC/XTs and ATs for $995.* SQL★Calc will soon be available on a wide variety of systems, including IBM mainframes, DEC, DG, and other superminis, and most UNIX systems.

For further information, or to order your copy of SQL★Calc, call 1-800-345-DBMS. Or write Oracle Corporation, Dept. CS, 20 Davis Drive, Belmont, CA 94002.

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Wang announces discounts

Desktops, terminals included under plan

LOWELL, Mass. — Wang Laboratories, Inc. recently announced a discount schedule for its desktop systems, workstations and selected peripherals that could result in customer savings of 6% to 30%.

Systems covered include the Wang Professional Computer, the Advanced Professional Computer and the Wang Office Assistant.

In addition, the schedule, available immediately, includes workstations, monitors and printers as well as the PIC image processing system and certain used and remanufactured desktop products.

Large accounts can receive 30% discounts on the purchase of 1,000 or more Wang microcomputers. A discount of 6% is available for purchases of 50 to 99 units of Wang's PIC image processing system and remanufactured and used desktop products.

The discount schedule replaces Wang's existing PC Quantity Discount Agreement and reportedly complements the firm's Annual Volume Discount Agreement and price-book discounts that are currently in effect. The program is for customers currently served by Wang's direct sales force.

Software evolves as PCs up power

From page 47

president of Borland International, Inc. According to Kahn, the industry has yet to take advantage of older processors. "It's amazing what you could've done with 64K-byte RAM chips on the Zilog, Inc. Z80. We're not doing a lot more today for the 80286." Software typically lags behind hardware, agreed Safi Quershey, president of AST Research, Inc. of Irvine, Calif.

"It takes several years to learn to use those advanced chips effectively," said Ralph K. Ungermann, president and chief executive officer of Ungermann-Bass, Inc.

The applications that eventually arrive, however, will strongly challenge the creativity of software developers, said Kent Johnson, president and CEO of Microrim, Inc. "Memory and disk capacity is getting to the point where we'll have the proverbial mainframe-on-a-desk within the next three to five years," Johnson said. "I expect products will start to have multiple interfaces because of the expanded storage and speed."

Increased use of graphics

Adrian King, Microsoft Corp.'s director of operating systems product marketing, said he envisions increased use of graphics as more memory becomes available. "That's not unique to Microsoft MS-DOS," he said. "We're just providing a more sophisticated base level" for development.

"What is happening with the operating system is we are recognizing hardware is more sophisticated, more powerful, and we need to evolve the level of the operating system today," King added.

New operating systems will create a revolution in applications software. "I believe all corporate PCs will be running totally new programs in three years," said Microsoft President Jon Shirley in his opening remarks to developers and users at the conference.

Today's hardware limitations on memory size and processor speed are fading, and "changes in hardware are going to fuel even greater changes in software," Shirley added.

Graphics replacement

Shirley said he expects a 640- by 480-pixel monitor to replace IBM's Enhanced Graphics Adapter (EGA). He said that it will sell for the price of the EGA, $500 to $600, and be fully compatible.

Also in mid-1987, expect a full-page, color-display graphics card for less than $1,500, he said. "That ought to forever stop whatever's left of the dedicated word processing business." Upgrades of current systems to more sophisticated processors are not impossible, according to Shirley. "There will be boards to bring the 8088 machines to 286 and even 386 power. They may need added memory. Certainly that technology exists. Whether it will be cost-effective, I don't know."

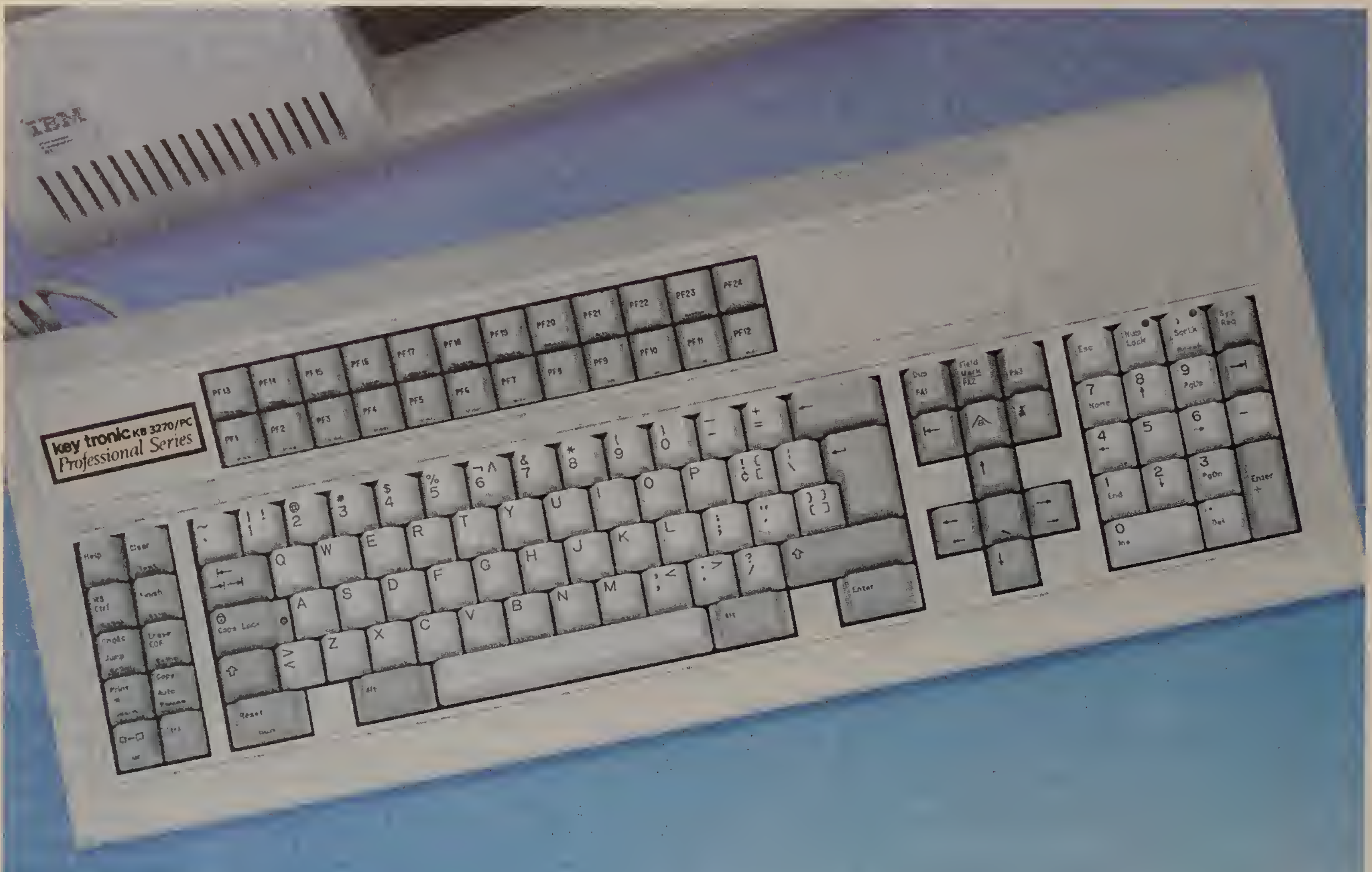
Advances in networking are as likely to bring changes in applications as in operating systems, Shirley said. "The 80386 allows development of low-cost, high-performance servers," he added.

Netbios standard

He believes that IBM's Netbios will be standard and that the departmental server will be a 386-based micro, not a minicomputer. That same computer can serve as the gateway to corporate DP resources, he said.

"This topology will require an entirely new library of software," Shirley said. A multitasking operating system will manage interprogram data exchange, electronic mail and other network functions.

"Application software is going to have to change to live in an integrated office environment," Shirley said. "We'll need to see a tight integration of multiple applications," even from different vendors. He concluded that Microsoft encourages that integration through a graphical interface such as its Windows environment.



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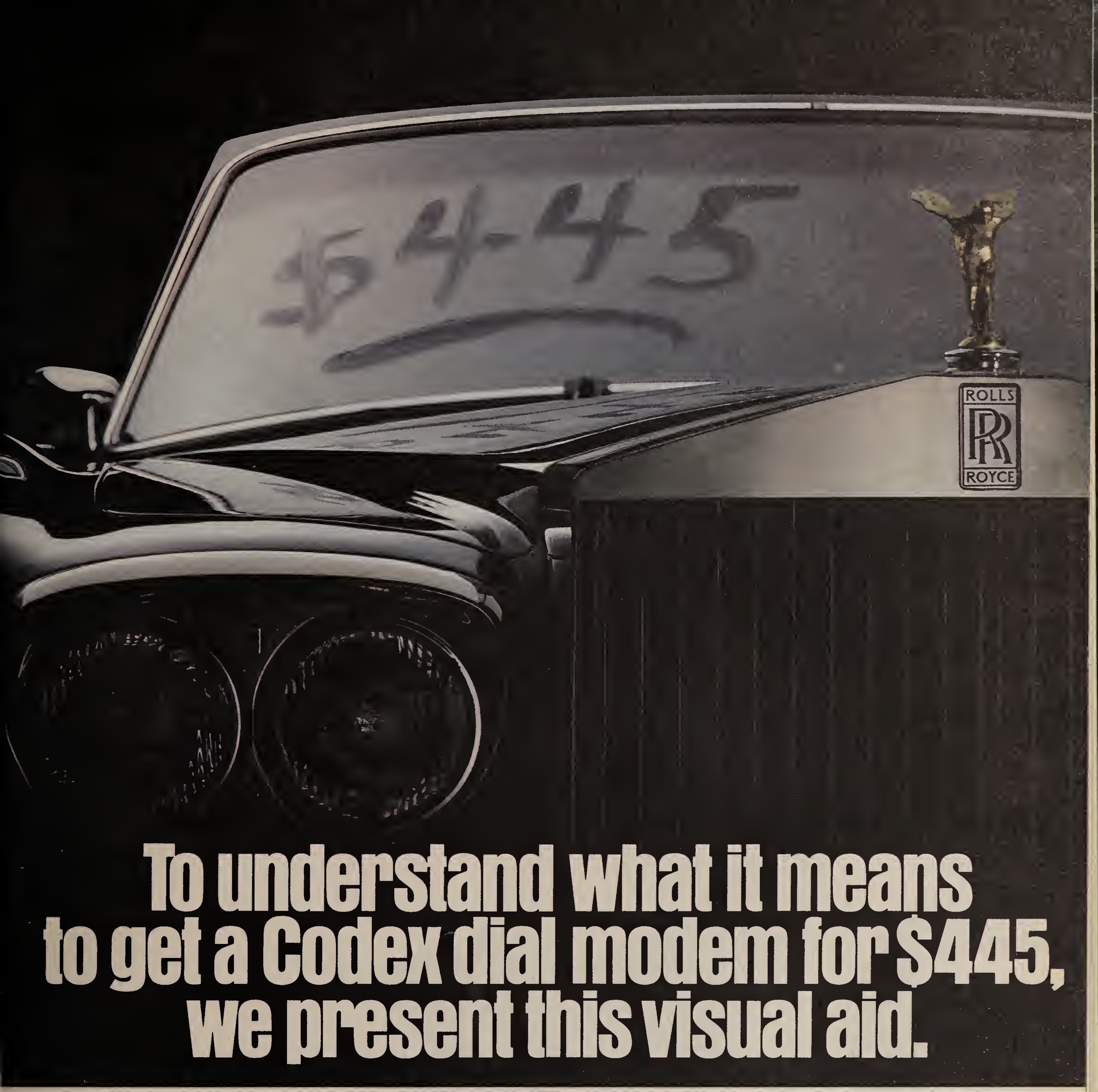

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The Fred Hutchinson Research Center in Seattle uses the Meridian SL-1* Integrated Services Network as more than a PBX. It gathers computers from around the Center into one cost-efficient resource. They're already using their Meridian SL-1 to network 300 terminals; Hewlett-Packard, Prime and DEC minicomputers; an IBM mainframe and, of course, their entire phone system. And they're ready for a future where sharing voice, data, text and image will be as simple as using a phone. Call (800) 328-8800.

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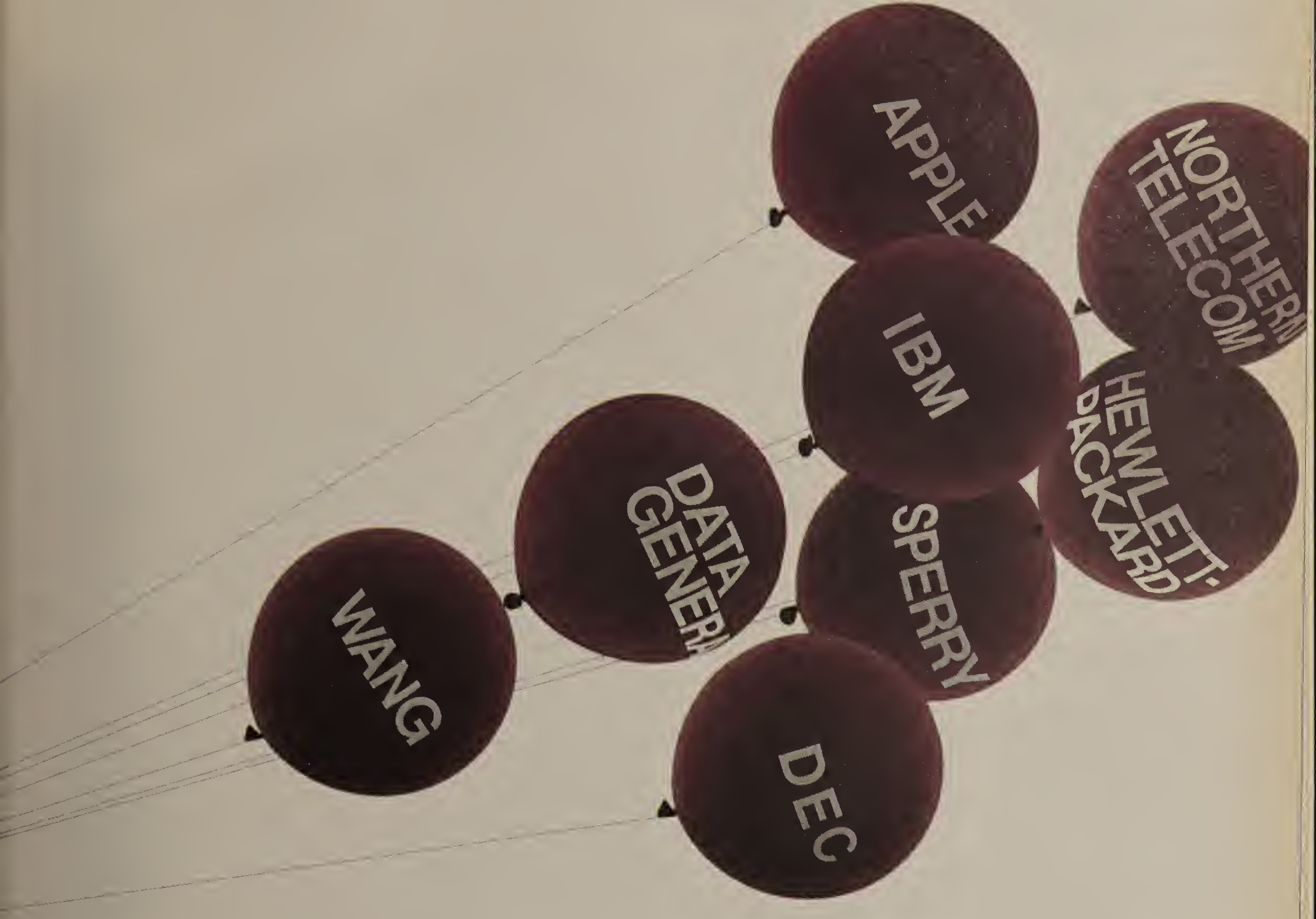

meridian SL-1

NETWORKING

Manzi looks beyond Kapor

From page 47

Apple's Macintosh, other than Jazz?
MANZI: We are not. I am sure lots of other people are, but presently we are not. Still our core market is IBM architecture and compatibles. It is the vast majority of the market, and it is a much bigger opportunity for us to do a great job there, rather than establish a position in the Macintosh marketplace.

CW: What have you learned about the Macintosh marketplace based on your experience with Jazz?
MANZI: I think the No. 1 thing we have learned is that you should never introduce a software product when the hardware company that you are looking to support is in self-destruct mode, which Apple was a year or 15 months ago.

It was probably the worst time in the history of mankind to introduce a product for that machine and that architecture.

We could have done a couple things better with positioning and introducing the product. But I think the most serious disadvantage was what was going on at Apple and the fact that Microsoft has an installed base to play with and offered extreme discounts on Excel.

CW: How would you do things differently now?
MANZI: We would not introduce a product when a company was imploding. I think the product is still a terrific product; I continue to use it every day.

CW: Are there other architectures you are interested in other than the Intel Corp., Microsoft MS-DOS and IBM PC worlds?
MANZI: Not yet, not really. Other than the Macintosh.

CW: Do you see Microsoft as becoming more of a challenge in the applications area? They have been talking about a PC version of Excel for nearly a year and a half now.
MANZI: Previous to shipping Microsoft Windows, they were talking about Windows for probably four years. I am sure there is a PC version of Excel coming and PC versions of all sorts of things coming.

Microsoft has aims at being all things to all people. They have a lot of ground in front of them in terms of establishing themselves as an applications company, not just in terms of products, but in the quality of the people they field in their sales and services organization.

CW: What do you think of Microsoft Windows, and will we see a Windows-compatible version of 1-2-3?
MANZI: You will never see 1-2-3 running in Windows as a Windows product. It ain't in the cards, and it is not something that would be particularly interesting or useful.

What we said in a February announcement was that we are developing at least one product for Windows, and that is all we have said publicly. Speculation about Windows being strategic to us or not strategic to us is really just speculation. We are working on one product, and that is where it stands.

CW: Will Lotus evolve differently with you at the helm, vis-a-vis Mitch Kapor at the helm?
MANZI: Not really, for a couple of reasons. One, Mitchell has been involved pretty exclusively in a research and development effort for two years and has had buy-in on company direction and policy but had really stepped aside as far back as two years ago. My job didn't change terribly much over the summer. I wouldn't know what to point to in terms of how things will be different now than when Mitchell was still part of the company.

CW: It seems that Lotus is moving away from single-package sales to selling in volume and selling a whole package of services along with the product to large corporations. Why the shift and how broad is that shift?
MANZI: The shift has not been anything that is precipitous but has been going on for three years. As more and more large customers start having very, very substantial investments in our products, there are companies out there with 20,000 to 25,000 copies of 1-2-3 and Symphony in place, and the purchase price of that translates into an enormous investment.

They have built systems around it and they have built complex applications using our products as the core of their own PC strategies. If anything, we were really reacting to needs and requirements of our customers.

CW: How much of an effort has there been to change the character of Lotus employees so that they are in tune with MIS issues and language?
MANZI: In the sales and service organization, that has been true for two, three years. We have, prior to shipping TAC, been staffing up with systems engineers and technical people in the field and people who are used to direct selling and who thrive in that kind of environment, but that has been the case for a couple of years.

It is really a matter of some emphasis in terms of the kinds of people we are bringing in, not really a change in direction.

CW: What has been the reaction of users to the MVP Plan?
MANZI: As far as key concerns that companies have identified, we handled most, if not all of those with last month's announcement.

See **MANZI** page 54

Systems Education That Works

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As word spread, customers asked to attend. In 1977, Amdahl opened its courses to students from other companies.

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OFFICE-READY.

A CONCEPT
WHOSE TIME HAS
COME.

Manzi looks beyond Kapor

From page 52

CW: Have there been any negative reactions that have prompted changes or thoughts of changes in the program?
MANZI: None whatsoever.

CW: People were satisfied with the policies toward copy protection and pricing?
MANZI: There is still the lone voice in the wilderness screaming about pricing and true site licensing in terms of onetime fees and duplication rights, but that is an insignificant minority.

As far as the vast bulk of the corporate audience out there, I think we absolutely dealt head-on with all of their requirements.

CW: Do you feel any lingering pressure to offer a site license?
MANZI: No. Not at all.

CW: Do you think Lotus will offer a pure site license in, say, the next five years?
MANZI: It is hard to say never, but I would probably say never. The thought of not paying per use is really alien to the company; it is really alien to our own economics.

It would not put us in a position where we could afford the kind of R&D spending that we are doing now in new product development and service and support spending.

CW: How are local processing devices changing with the faster and more powerful chips, such as the Intel 80386 that is used in the Compaq Computer Corp. Deskpro 386?
MANZI: The 80386 is a terrific processor. It puts mainframe-type processing on a user's desk. The real hang-up in the marketplace is a function of the lack of any suitable large-memory, multitasking operating system.

It is anybody's guess as to where that is and when that is, but in some respects, Microsoft is holding up the works here because the software is lagging [behind] the hardware.

The application software is waiting for systems software to catch up. It is a machine you can plan with. It is going to be very hard to obsolete that machine for four or five years.

CW: Is it difficult to plan to write for a machine like that when IBM hasn't indicated what its plans are for the 386?
MANZI: It would be interesting, always, if everything was fully disclosed by everybody, not just IBM, but that has not been the case historically in the industry.

Many different companies have held different pieces, and a company like Lotus can very intelligently plan for what those products are going to look like and what they are going to do.

CW: What advances are left to be made in spreadsheets?
MANZI: There are some things that can be done in terms of auditing and checking and model verification, clearly making some of the things that are difficult to do now easier to do. There are some presentation aspects of spreadsheets that might be improved upon, no time soon — again, it is constrained by existing technology — but there are lots of things.

CW: How is your approach to the information services market different from that of Ashton-Tate, which has been reaching agreements with other vendors for communications links?
MANZI: I really don't understand Ashton-Tate's strategy there. If Ashton-Tate is doing what you are suggesting, then clearly we are taking a different approach to the market.

CW: Ashton-Tate has also been talking about getting into the mini and mainframe data base management system market through acquisitions. Any chance of Lotus pursuing that strategy, either through acquisition or internal development?
MANZI: We have a fairly robust R&D effort going on in a number of areas, and we obviously would not comment on acquisition plans even though there aren't presently any.

CW: How important is it that Lotus products be used on local-area networks, and how will they be used?
MANZI: The current state of technology in terms of what you can do with software, given the crudity of the underlying systems software supporting local-area networks, is not terribly interesting.

Yes, you can run 1-2-3 from a file server and put it onto a PC; that is not exactly a high-value application in most situations.

To the extent that systems software actually works to support local-area networks and unlocks the potential that is there in terms of group productivity or other applications, the whole market is being dragged down or slowed down by the absence of that systems software and the absence of a coherent standard in the whole local-area network field.

CW: Where will the bulk of Lotus's growth come from?
MANZI: There are three pieces of where future revenue is going to come from in terms of diversification.

One is from geographic expansion, from new product development and introductions, some of which will happen this year, some next year and from new businesses, such as those we have undertaken in the Information Services Division.

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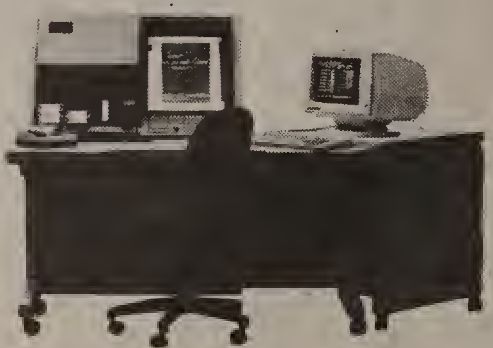

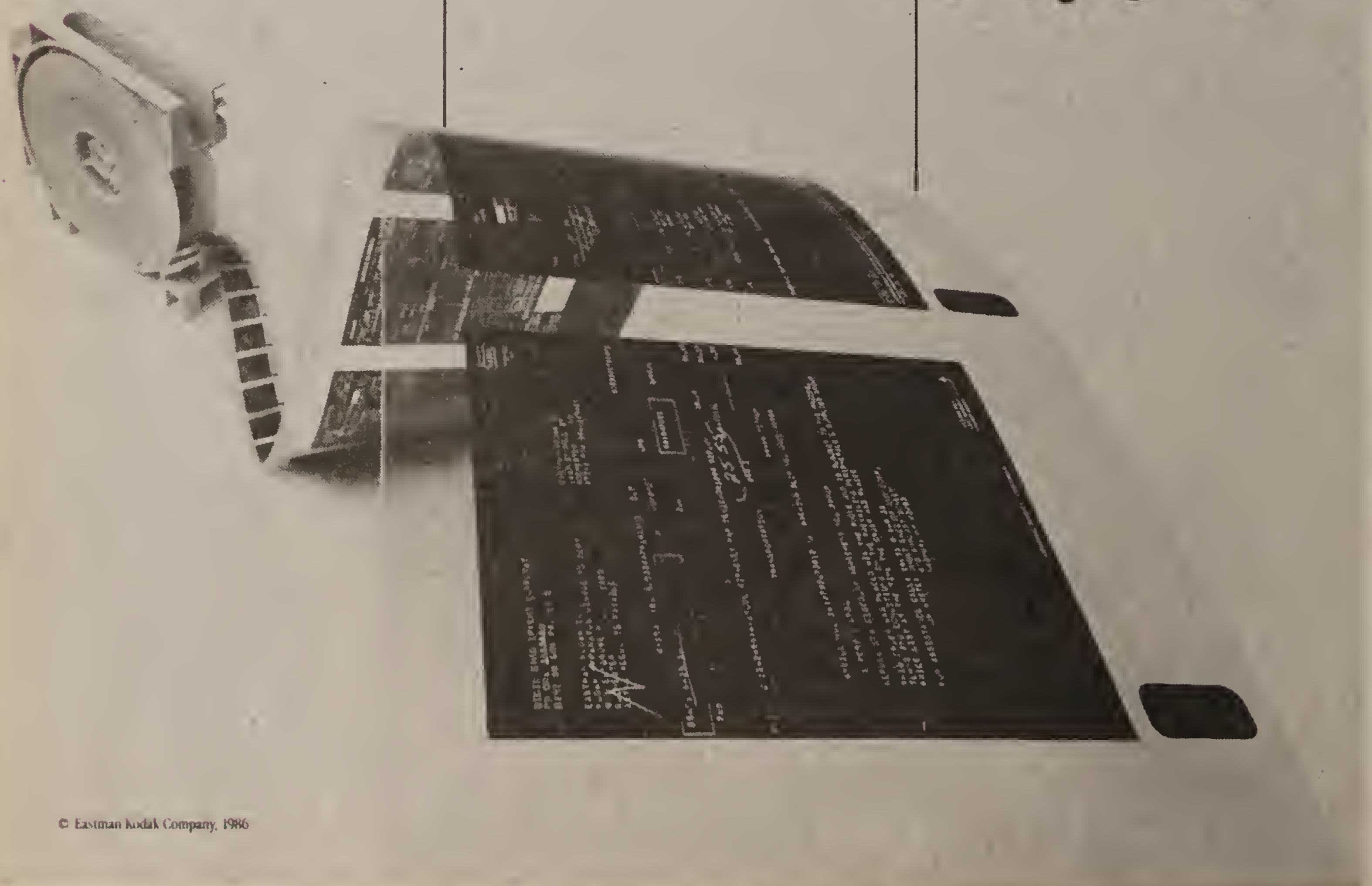

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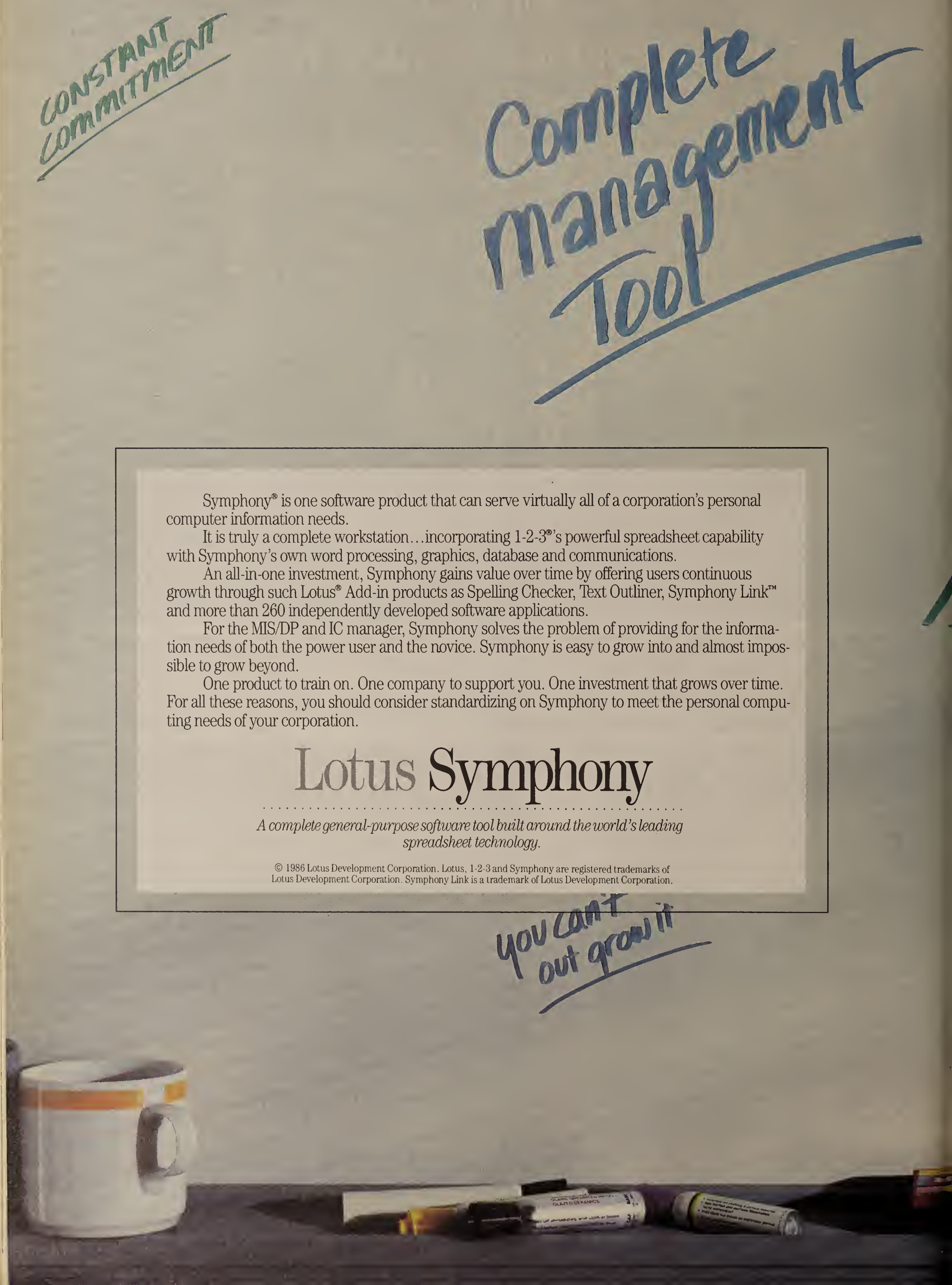

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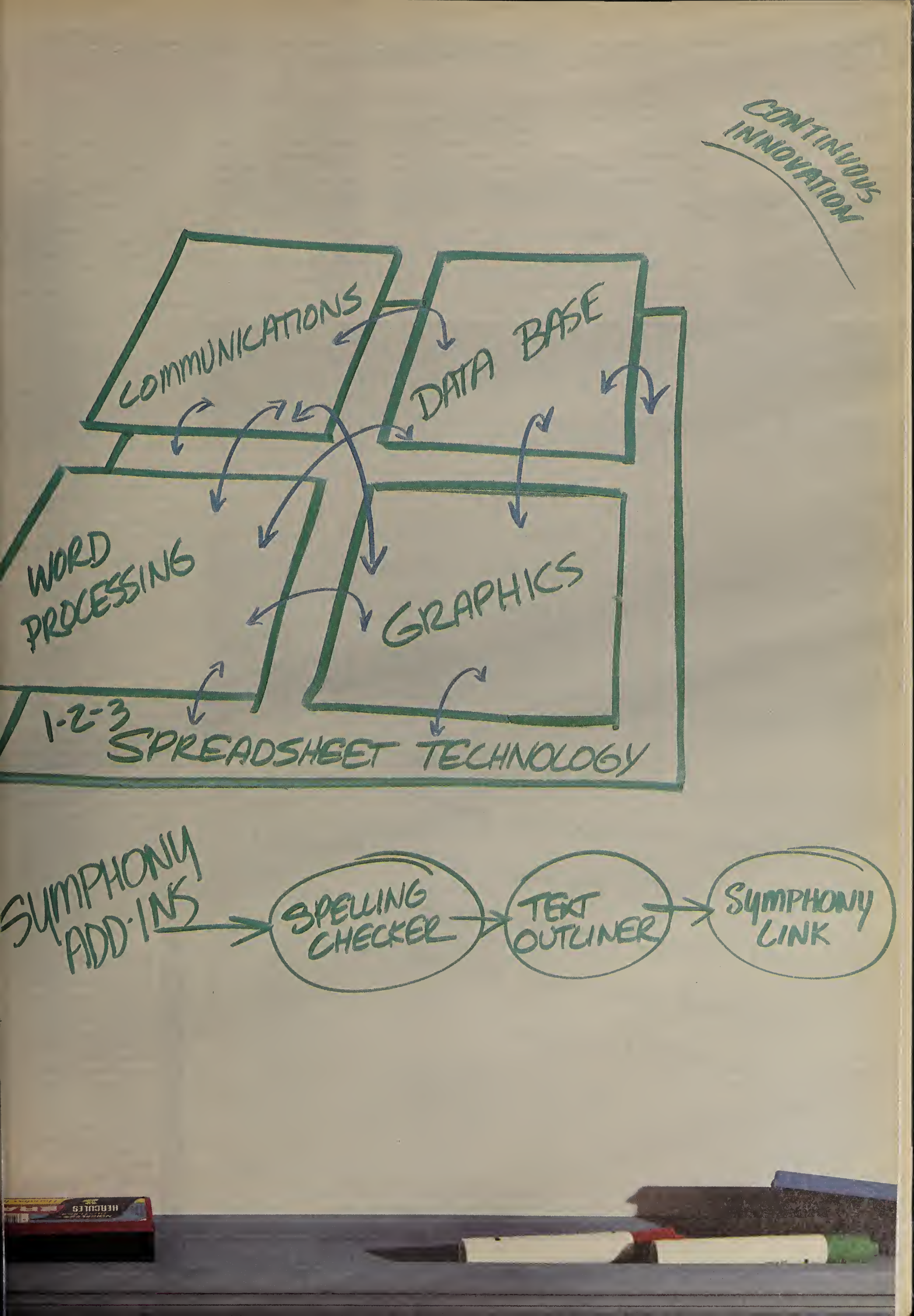
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To the exotic land of AI

From page 47

preferred in Europe, the availability of Turbo Prolog may very well lead to much wider acceptance of Prolog in North America.

Prolog is also the language at the heart of ICOT, the Japanese fifth-generation project launched in 1983. Building specialized machines designed for the execution of Prolog is a key element of that project.

Turbo Prolog gives anyone with an IBM Personal Computer or compatible the ability to match the capabilities and performance of the fifth-generation prototype system developed by the Japanese project.

Nonprocedural language

The Prolog language is nonprocedural in that instead of explicitly defining the steps to be taken in solving a problem, the programmer defines a set of logical rules and one or more goals for solution. Prolog, in effect, searches the logical space created by the rules and finds the required solution.

Turbo Prolog comes on two floppy disks packaged with the paperbound Turbo Prolog manual. The latter includes an extremely well-written tutorial on Prolog richly supplied with example programs.

By working through the manual/tutorial, any reasonably intelligent person possessing a general familiarity with microcomputers and some programming background will be able to gain a thorough understanding of Prolog as well as its capabilities.

'Programmer's Guide'

Of particular value to somewhat more sophisticated programmers is Chapter 11, entitled "Programmer's Guide." This chapter provides a straightforward explanation of the internal workings of Turbo Prolog.

It also contains a wealth of information about programming techniques and the use of compiler directives, dynamic data bases and techniques for interfacing between Prolog and other languages (C, Pascal and Fortran).

Of course, Turbo Prolog is much more than just an introduction to Prolog. The product also serves as a powerful Prolog compiler and development system that offers all the desirable features of Borland's Turbo Pascal and then some.

A basic four-window interface with pull-down menus makes program development and checkout a snap.

Editor window offered

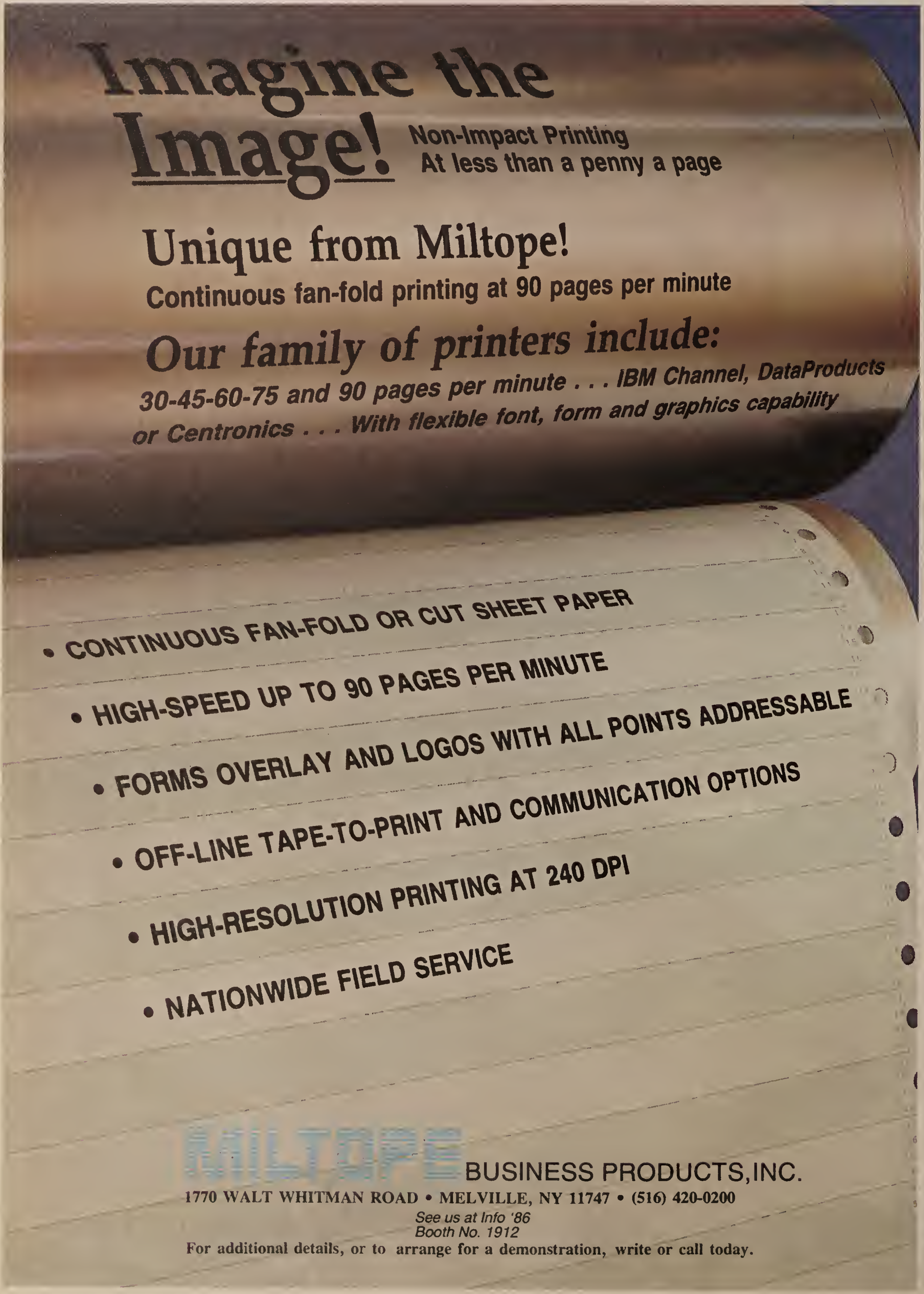
An editor window for creating and manipulating program text offers a Micropro International Corp. Wordstar-like editor that will be instantly familiar to users of Turbo Pascal or Borland's Sidekick.

Compile errors are identified with a message at the bottom of this window and the cursor is sent to the offending statement.

In addition, the dialogue window provides for communication between the executing program and the user and the message window offers run-time messages when appropriate.

Finally, a trace window makes it possible to monitor program execution for debugging and problem determination. All four windows can easily be moved, resized or suppressed if desired.

Turbo Prolog offers an outstanding and inexpensive way for an individual or organization to gain direct experience with artificial intelligence applications. But it is much more than that.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Hardware Roundup

Large and medium-scale systems

Edited by Barbara Wierzbicki

'It is ironic that there was a bit of role reversal. Up until 1986, there was a feeling that IBM could do nothing wrong. Now they can't seem to do anything right, and DEC can do no wrong.'

By JAMES CONNOLLY

At first glance, the 14 months since *Computerworld*'s 1985 Hardware Roundup may seem to have been a slow period for vendors in the mainframe and superminicomputer business. The market share among large systems vendors has not shifted dramatically since last August. Slow sales have led to declining profits, reorganizations and even layoffs in major companies.

A closer look, however, reveals that the supermini and mainframe market has been surprisingly dynamic. Almost all of the mainframe vendors revamped their product lines by announcing new high-end systems, filling out mainframe lines with entry-level systems or finally delivering previously announced systems during those 14 months.

It was a year of IBM and DEC — and DEC and IBM. Their traditional competitors attempted to keep pace — with Burroughs Corp. trying to play leapfrog via a merger tactic — while new rivals touting new technologies fought to break out of the pack. But despite such challenges, IBM and Digital Equipment Corp. continued to lead the race for dollars — and attention — in the large and medium-scale computer market. The $50 billion IBM claims 75% of the mainframe market while sharing the lead with $6.7 billion DEC in the medium-scale or superminicomputer range.

DEC's steady progress in sales of its VAX line caught the eyes of the same Wall Street analysts who had looked unfavorably on the Maynard, Mass.-based company just a couple of years ago. At one point, DEC's stock price passed IBM's as the analysts commented on weak IBM mainframe sales and poor IBM small systems performance.

"It is ironic that there was a bit of role reversal," says analyst Omri Serlin of Itom International Co., a Los Altos, Calif., consulting firm. "Up until 1986, there was a feeling that IBM could do nothing wrong. Now they can't seem to do anything right, and DEC can do no wrong," he declares.

During the past 14 months, the medium-scale systems market has also been shaken up — with DEC doing most of the shaking. To wit, DEC essentially replaced all seven superminis listed in the 1985 Hardware Roundup with its VAXBI bus-based VAX 8000 family.

Large systems in the class of the IBM 3090 — nicknamed Sierra — and the Burroughs A 15 families established themselves as the primary big business mainframes during the past year. Medium-scale product lines like DEC's VAX, Data General Corp.'s Eclipse MV series and the IBM 4381 and System/38 families have been revamped. Meanwhile, vendors of new technology boxes like the Hewlett-Packard Co. Spectrum series and about a dozen parallel processors made claims about their systems being the computers of the future.

Some observers interpreted weak mainframe sales as a sign that downsizing — the shifting of traditional mainframe applications to smaller systems — has hit. But International Data Corp. (IDC) Vice-President for Systems Research David Moschella notes that the mainframe market will continue to grow, even if it is at a slower pace than the rest of the industry and slower than during the abnormal boom years of 1982 to 1984.

"Mainframes are the most expensive way to do computing. So, anything that can be done on smaller systems should be. But by the same token, there are, and will continue to be, many things that can only be done on the largest system you can build," Moschella says.

Moschella also maintains that DEC's claims of providing mainframe-scale power by clustering a group of VAX systems are sometimes inaccurate. "It is not a direct replacement for a mainframe. If you have a large data base and a lot of terminals with a lot of updating, a mainframe is still better," he says. However, he notes that DEC has enjoyed some success in competing with IBM for large corporate accounts.

Regarding IBM, Moschella says that while the 4381 is competitive with the VAX 8600 family in a hardware sense, IBM still does not offer software with the ease of use and minimal maintenance that customers want. He expects IBM to address its problem of "old, patched software" by continuing to push customers to its DB2. However, he adds that IBM and other mainframe vendors still must make their multiple-CPU systems act as a single system.

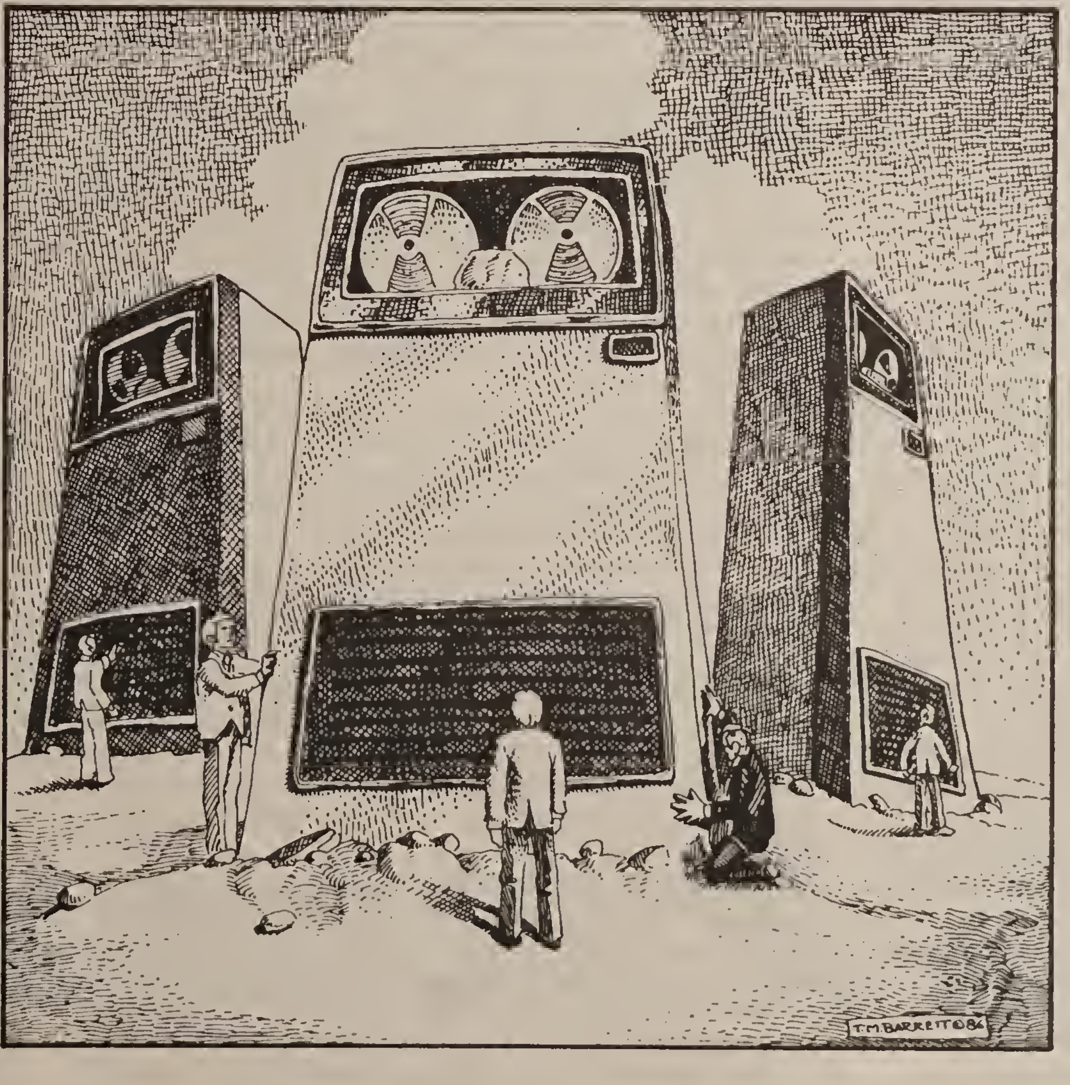

ILLUSTRATION BY TOM BARRETT

One of the key products in the large systems market just recently made its debut. IBM's largest system, the 3090 Model 400, was first delivered fewer than six weeks ago. The earliest customers are all companies upgrading to the Model 400 from the Model 200 first shipped last fall.

IBM twice advanced delivery of the Model 400, from the second quarter of 1987 to the fourth quarter of this year and again to late August. Analysts speculated that the early shipments were to boost IBM's weak revenue figures for the third and fourth quarters of this year.

Even before delivering the four-processor Model 400, IBM cut prices by 10% and doubled the capacity of the expanded storage feature for it and the dual-processor Model 200 in February and, at the same time, filled out the product line with a pair of uniprocessor 3090s. Those single-processor versions included the Model 180, delivered in March, and the tuned-down Model 150, which included no expanded storage feature and was first installed in June.

Measured in terms of millions of instructions per second (MIPS), the 3090 line now ranges from an estimated 9.2 MIPS for the Model 150 to about 52 MIPS for the Model 400. That performance range stretches from the middle of the older 3080 mainframe line by offering almost twice the power of the earlier 3084 Model QX.

The 3080s remain available and popular, particularly in the used systems market and as upgrades. IBM cut prices for this line, but it is the 3090 family that IBM is more actively promoting. What many users and analysts have been watching for, however, is IBM to more clearly distinguish the functions on the 3090 from those of the 3080, with the greatest speculation centering on when or if IBM will increase the 3090's channel capacity to as much as 6M byte/sec.

In the medium-scale market, IBM tried to squeeze another year out of its 4381 lineup by replacing three 4381 models with four models, including the new entry-level 4381 Model 11. This lineup, which many observers expect to be replaced by a CMOS-based 4381 family early next year, reportedly provides more power at the high end, at 6 MIPS, while improving the price/performance ratios up and down the line in order to better combat DEC.

The remainder of the 4300 line did not fare so well. The 4361 essentially sat unchanged, awaiting, as some people say, the arrival of its replacement in the shape of IBM's Micro370 before the end of 1986. IBM slammed the door on the older 4341 family, withdrawing the last 4341 from

Continued on next page

Connolly is Computerworld's *senior editor, systems & peripherals.*

Mainframe market surprisingly dynamic

Continued from previous page

marketing with its February announcements.

Another product family feeling the kiss of death was the 8100 line of distributed processors, which IBM says will receive no significant hardware enhancements. IBM offered a lifeline to some 8100 customers by stating that it hoped to let them move their DPPX operating system to the IBM 370 mainframe architecture.

IBM focused many of its 4300 marketing efforts on the scientific and engineering arenas. However, it also tried to drive the 3090 into those same technical fields with the announcement of an optional, add-on vector processing facility for the 3090.

After the February wave of announcements, IBM struck with a product blitz again in June, when it used the 1986 National Computer Conference as a platform to introduce new models and enhancements for the System/36 and System/38 minicomputers. Most of the models of the System/36 and System/38, which IBM is trying to move closer together, remain in the small systems category. But *Computerworld* classifies the more powerful System/38 Models 300, 400, 600 and 700 as medium-scale machines.

IBM had something to offer users of most of its product lines, even though many of those users continued their cries for more power into the autumn.

Meanwhile, IBM's chief large systems rivals tried to match IBM's steps while maintaining what they claim are price/performance advantages. In the case of Amdahl Corp. and National Advanced Systems Corp. (NAS), the two IBM-compatible large systems vendors in the U.S., keeping that edge often means undercutting IBM's price by 15%, which IBM made more difficult when it slashed its own prices early in the year. Amdahl had to respond with its own price cuts in the spring.

> ***IBM had something to offer users of most of its product lines, even though many of those users continued their cries for more power into the autumn.***

NAS introduced its first two Sierra-class systems, the AS/XL Models 60 and 80, shortly after IBM announced the 3090 Models 200 and 400 in early 1985. NAS, whose systems are built by Hitachi, Ltd. in Japan, then added the entry-level AS/XL Model 50 and the high-end AS/XL Models 90 and 100. NAS, with performance claims that translate to about 87 MIPS for the Model 100, then began delivering its first Model 60s and 80s during this summer. NAS also claimed 12% performance gains when it announced enhancements for its IBM 3080-class line of AS/8000 machines.

NAS answered IBM's vector processing facility announcement with its own mid-summer introduction of vector processor-equipped AS/XLs.

Amdahl, which gets some of its technology from principal owner Fujitsu, Ltd. of Japan, waited until late 1985 to announce its 5890 series of Sierra-class systems. Amdahl introduced three 5890s, including the 27-MIPS 5890-200 and the 36-MIPS 5890-300 dual-processor systems and the 56-MIPS, four-processor 5890-600.

In other announcements, Amdahl introduced its Multiple Domain Feature for the 10 systems of the 580 series, including the 5890, and hiked some channel speeds on the 580s from 3M byte/sec. to 4.5M byte/sec. The Multiple Domain Feature is a hardware answer to IBM's VM operating environment, allowing a single system to run multiple operating systems simultaneously. Amdahl also pushed Unix as a mainframe operating system, offering its UTS/580 in native mode.

Long known as the BUNCH, those vendors that offer non-IBM-compatible mainframes broke up when Burroughs launched a successful takeover of Sperry Corp. Burroughs officials promised to continue Sperry's product line, including the Sperry 1100 mainframe family, as well as Burroughs' own lines.

While most of Sperry's large systems announcements during the past year focused on peripherals such as enhanced disk and tape drives, Burroughs answered IBM's 3090 deliveries with the first shipments of its high-end A 15 and a string of other processor announcements. Those included the large-scale A 12, running at an estimated 8.6 MIPS and capable of being upgraded to an A 15. Burroughs also filled out the A series and V 300 series.

The company added the A 10 small mainframe, which can be bought as a new system or as an upgrade from the existing A 9. Where Burroughs had the A 3 as its entry-level A series system since October 1984, it supplemented the line with the A 5, to which A 3 system users can upgrade. Burroughs also quietly introduced a small system known as the A 2. Positioned below the A 3 in Burroughs' product line, the A 2 is being offered principally to existing Burroughs customers.

Released as a successor to the B2000, B3000 and B4000 families of mid-range systems a year earlier, the Burroughs V 300 line was filled out with the addition of two models of the entry-level V 310. Burroughs enhanced all of the V 300s with the announcement of a new operating system for the series. MCP/VS 1.0 reportedly boosted the amount of memory that can be addressed in a V 300 from 5M bytes to 40M bytes.

Another BUNCH member, Honeywell, Inc., announced several 3090 and high-end 3080 competitors just last month. The DPS 88/861, pitted against the 3090 Model 150 and the DPS 88/891, which Honeywell says is comparable to a 3090 Model 180, were developed in Phoenix, rather than purchased from NEC, Ltd., as is Honeywell's larger DPS 90 series.

The 861 and 891 are available in single- and dual-processor configurations and as fully redundant systems. They replace the DPS 88 systems, which can be upgraded to the new products. They reportedly offer advantages, such as double the memory because of the use of 256K-bit chips, and now provide disk cache, disk I/O management techniques and support for high-performance peripherals under the Federal Information Processing Standard as standard features.

Honeywell also delivered the first NEC-made DPS 90 systems and then announced a venture with NEC under which the companies will market NEC supercomputers in the U.S. Honeywell then set off speculation about more joint ventures or technology-sharing agreements with NEC and Groupe Bull of France when it announced two weeks ago that it is restructuring its information systems group.

At the medium-scale processor level, Honeywell launched a new line of office-environment superminicomputers, known as the DPS 6 Plus Models 410 and 420. These are modular systems that can be configured with up to four processors and are intended to be key elements in Honeywell's office integration strategy.

Control Data Corp., which introduced its Cyber/180 line of superminis and mainframes two years ago, delivered its first high-end Cyber/180 990, claiming near-supercomputer performance for that system. In addition, CDC enhanced most of the Cyber/180s with greater memory and I/O capabilities and then cut CPU prices by up to 30%.

Long considered a member of the BUNCH, NCR Corp. continued to drift away from the mainframe vendors with its 9800 line of medium-scale, fault-tolerant transaction processing systems. NCR Chairman Charles Exley ruled out the idea of building monolithic mainframes, favoring more modular systems. Exley indicated that NCR's high-end 8500 series will be replaced by a system using a 9800-type of architecture.

NCR officials and analysts agreed that NCR leans away from the IBM-dominated mainframe world and toward the superminicomputer market. That is the market in which NCR must face DEC.

DEC has not only replaced its product line, it has greatly expanded the range of power. Only a few years ago, DEC's most powerful VAX system was the 1-MIPS VAX-11/780, which remains one of the most used systems in superminicomputer vendors' competitive benchmark reports. DEC now rates all six of its VAX 8000 series systems at or above the 11/780 in performance, with the high-end 8800 offering 12 times the power of the former high-end 11/780.

IDC's Moschella notes that the availability of DEC's BI bus on most of the VAX 8000 series machines

Continued on page 62

Roundup '86 setup

This year's Hardware Roundup was compiled by *Computerworld* using questionnaires mailed to vendors of personal computers and small, medium-scale and large systems. Where possible, International Data Corp.'s (IDC) definitions for these categories were used to place systems in groups with their likely competitors.

This week we cover large-scale and medium-scale systems. Small systems will be addressed in the Oct. 13 issue. The Hardware Roundup will conclude on Oct. 20 with a look at the microcomputer industry.

In addition to this week's coverage of large and medium-scale computers, systems that are used primarily for transaction processing, rather than general-purpose computing, are grouped together. Parallel or multiprocessing systems aimed primarily at the scientific market are listed separately.

In cases where vendors did not supply the requested information, *Computerworld* filled in the blanks, where possible, using earlier vendor literature or statements. Responses listed as "NA" are instances in which a manufacturer either failed to answer a question or the question did not apply to a vendor's system.

Many of the estimates deal with performance as measured in terms of millions of instructions per second (MIPS), millions of floating-point operations per second (MFLOPS) or Whetstone instructions per second. Estimated internal-throughput performance numbers are offered only as a guide for users to position a system.

The numbers are listed with the understanding that some vendors object to their use, although some of those same vendors use their own MIPS or MFLOPS numbers in their product announcements or competitive analyses. The internal-throughput figures are offered in lieu of a generally accepted measurement for terminal-to-terminal performance.

One of the more controversial aspects of previous roundups — relative performance in comparison with the IBM 370/158 Model 3 — has been eliminated because it had outlived its credibility. *Computerworld* editors are searching for a replacement for that relative performance rating system and welcome suggestions.

Finally, vendors may object to their products being classified as medium-scale systems when they claim to sell mainframes. Use of the IDC classifications is intended to position systems with their likely competitors regardless of what the vendor calls the product.

Thus, for example, processors such as IBM's 4381, commonly known as mainframes, are listed as medium-scale systems because their prices and typical user configurations pit them most commonly against superminicomputers such as the Digital Equipment Corp. VAX 8600.

— JAMES CONNOLLY

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Continued from page 60

provides users with more flexibility in a smaller package than the earlier Unibus, while also allowing DEC more control over its third-party competitors.

Itom's Serlin adds that one irony in DEC's success story is that financial analysts point to DEC's common VAX architecture and IBM's incompatible product lines as key reasons for DEC's rebound. But Serlin notes that DEC has not extended a compatibility bridge from the VAXs to its PDP-11 minicomputers and that, even at the peak of its success, IBM offered incompatible products. Serlin also claims that despite DEC's emphasis on networking, IBM's Systems Network Architecture offers greater functionality than DEC's Decnet.

DEC's announcements during the past year ranged from small-scale systems like the 8200 to high-end scientific and engineering systems such as the 8800. It also was the year in which DEC focused on selling in the commercial DP market, trying to convince Fortune 1,000-size companies to use DEC equipment rather than IBM systems for both commercial and technical computing.

One of DEC's principal supermini-computer rivals, HP, took what even its top executives consider a gamble when it introduced the first products of a project code-named Spectrum. HP took a chance on reduced-instruction set computing (RISC) when it announced its HP 3000 Series 930 and HP 3000 Series 950. Those RISC-based machines are the successors to HP's von Neumann-architecture HP 3000 minicomputers. The 930 is scheduled for delivery by the end of this year, with the 950 to follow in 1987. Meanwhile, HP emphasized that the new systems and the older HP 3000 systems are compatible with each other and introduced new high-end and mid-range replacements for some of the older systems.

Minicomputer vendor DG answered DEC's VAX 8000 series announcements with its Eclipse MV20000 release. However, DG left most of the Eclipse family intact, except for plugging a few gaps with small systems like the MV7800 and MV2000DC.

Meanwhile, Prime Computer, Inc. reworked most of its 50 series of superminis with a string of announcements. Most of the new systems provide tuned-up CPUs and up to double the memory of their predecessors. Prime, like HP, began looking at RISC, although in Prime's case it involved an agreement to use MIPS Computer Systems, Inc. boards in a workstation, rather than general-purpose CPUs. Like DEC and IBM, Prime tried to drive into the commercial DP market while serving its traditional technical computing base.

The distinction, however, between commercial and technical and the distinction between commercial and fault tolerant or transaction processing have become vague.

Long known for its fault-tolerant transaction processors, Tandem Computers, Inc. began emphasizing the general-purpose nature of its systems. Tandem also added its high-end VLX and low-end EXT 10 and EXT 25 systems.

IBM expanded its role in the fault-tolerant industry by adding software, performance enhancements and communications tools to its System/88 family, which is a renamed version of Stratus Computer, Inc.'s product line.

Further blurring the line between commercial and technical systems, RISC, parallel processor and multiprocessor vendors such as Ridge Computers Co. and Pyramid Technology Corp. targeted their systems at commercial DP, scientific and engineering applications. Even established minicomputer vendors such as Harris Corp., which expanded its Unix-based superminicomputer lineup, billed their systems as general-purpose machines. However, Harris more clearly defined general-purpose applications to include uses such as office automation support for engineers and other technical users.

In the purely scientific field of supercomputing, Cray Research, Inc. twice enhanced it X-MP series and expanded its market share to an estimated 40 system shipments this year, including the first deliveries of its high-end Cray-2. IDC's Moschella characterizes Cray's market dominance as just phenomenal.

Other vendors continued their attempts to steal Cray's business with massively parallel machines, although most of the systems shipped by vendors like Floating Point Systems, Inc. went to customers such as government laboratories in which they are expected to be used in an experimental or software-development mode for several more years. Some vendors, such as Floating Point, claim the ability to run several thousand processors in parallel.

Another group of vendors is trying to steal Cray's market share from below. Minisupercomputer makers, such as Sequent Computer Systems, Inc. and Elxsi Co., generally claim to fit between the VAX 8800 and the Cray X-MP. These vendors may pose greater threats to supercomputer time-sharing organizations than to Cray itself, because they give smaller organizations a chance to own their own system, Moschella notes.

So, while sales of some large systems failed to meet expectations, and while users continued their cries for more power and more flexibility, changes did occur during the past 14 months. Even if the changes were evolutionary, rather than revolutionary, computer users and DP managers had something to talk about and new technologies to test. ■

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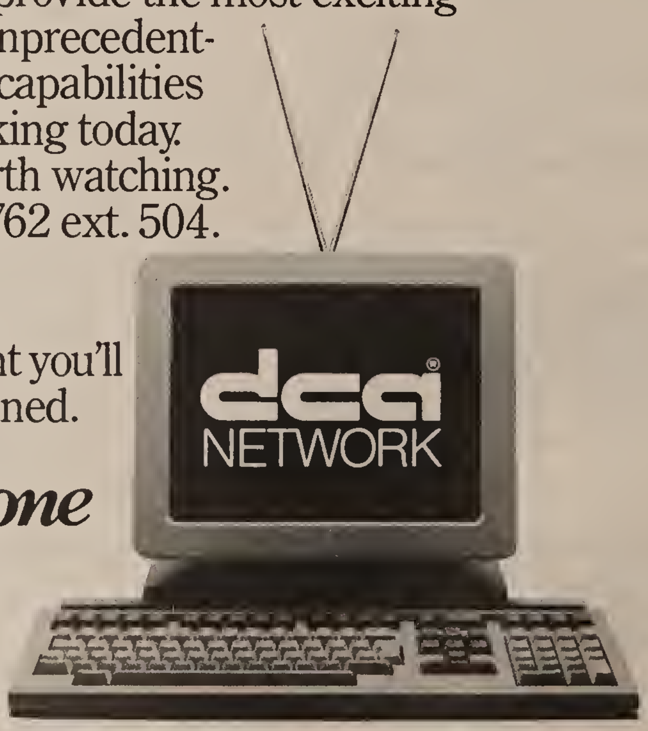

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An active BUNCH: NCR grows; Sperry, Burroughs merge

By JEFFRY BEELER

Since last fall, robust health and lingering illness have coexisted among the BUNCH suppliers, which include Burroughs Corp., Sperry Corp., NCR Corp., Control Data Corp. and Honeywell, Inc.

At the high end of the performance scale stands NCR. With second-quarter 1986 revenue of nearly $1.2 billion and a 16.4% increase in earnings growth for the same period last year totaling $77.5 million, it has financially outpaced all other mainframe vendors, including IBM, by excelling in carefully defined market niches.

At the opposite end of the performance spectrum lies the financially beleaguered CDC, which lately has struggled desperately to just stay alive. Honeywell falls somewhere between the two extremes along with Burroughs and Sperry, whose destinies are now intertwined following the year's best publicized merger.

> ***NCR has financially outpaced all other mainframe vendors, including IBM, by excelling in carefully defined market niches.***

During the past 12 months, NCR announced new products in several important categories, including personal computers, terminals and superminis. But without question, this year's introduction of its Model 9800 mainframe, which marks NCR's debut in transaction processing, represents the biggest change at the Dayton, Ohio-based firm.

"Announcement of the 9800 gives NCR a way of meeting the requirements of its key users, which include many banks and retail store chains," says Michael Geran, vice-president of research at E. F. Hutton & Co. "At the same time, the product also allows the company to preserve compatibility with its older machines."

In its initial implementation, the 9800 proved fairly limited in both capacity and performance, according to a number of users interviewed at the NCR users group meeting held earlier this year in Phoenix. But by mid-1987, Geran expects NCR to address the CPU's shortcomings by announcing an enhanced version.

Unlike NCR, CDC has spent the bulk of the past year in continuing turmoil and financial uncertainty. Unavoidable setbacks in the time-sharing business and poor performance in both the supercomputing and peripherals fields have forced CDC to downsize and sell assets in an attempt to avert bankruptcy.

Thus far, the company's tactics "seem to be working quite well," according to William Easterbrook, a partner in San Francisco-based Kidder Peabody & Co. "CDC is slowly extricating itself from difficulty and will probably remain an independent entity, though a much smaller one than when its problems began."

Of all the BUNCH companies, those that have undergone the greatest upheaval in recent months are Sperry and Burroughs, the latter of which acquired the former. Reaction to the union remains decidedly mixed. Harry Edelson, managing partner in Saddlebrook, N.J.-based Edelson Technology Partners, Inc., views the acquisition somewhat skeptically.

"From a financial standpoint, the merger may work by allowing the two companies to downsize and gain economies of scale," Edelson says. "But from an operational point of view, it doesn't make sense."

Easterbrook, however, takes just the opposite position. "Three or four years from now," he predicts, "the combined company will be a much greater industry force than the two separate organizations have been in the past. In the commodities business, which is what the hardware arena is fast becoming, size is all important."

Easterbrook expects Sperry's product line to merge someday with Burroughs', although the two firms will probably proceed slowly. In the intermediate range, the combined company will likely move to industry-standard software such as Unix and IBM's PC-DOS to counter competitors, Easterbrook declares.

Analysts are also sharply divided over the changes that have taken place recently inside Honeywell. Sandra Gant, vice-president of small systems service at Cupertino, Calif.-based Infocorp, commends Honeywell for its recent introduction of a 32-bit office system that maintains compatibility with the vendor's existing 16-bit product line.

But Edelson dismisses the company's move as "not that much different from anyone else's." ■

Beeler is a Computerworld *West Coast correspondent.*

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	Date First Installed	Primary Market	Most Comparable DEC or IBM System	Performance in MIPS or MFLOPS	Performance (millions of Whetstones/sec.)	Machine Cycle Time (nsec)	Main Memory Range (M bytes)	Disk Transfer Rate (M bytes)	Maximum I/O Bandwidth (M bytes)	Ports/Channels	Operating System	Maximum Number of Users	Typical Number of Users	Word Length (bits)	Base Price
Amdahl Corp. 1250 E. Arques Ave. Sunnyvale, Calif. 94088 *Amdahl 580 Model 5840*	1983	Commercial DP, scientific/engineering, transaction processing (TP)	IBM 3080, 3090	8.4	NA	23.25	16-128	3	96	16-32	UTS/580, MVS/370, MVS/SP, MVS/XA, VM/SP, ACP, TPF	NA	NA	32	$1,270,000 (16M bytes)
Amdahl 580 Model 5850	1983	Commercial DP, scientific/engineering, TP	IBM 3080, 3090	11.6	NA	23.25	16-128	3	96	16-32	UTS/580, MVS/370, MVS/SP, MVS/XA, VM/SP, ACP, TPF	NA	NA	32	$1,450,000 (16M bytes)
Amdahl 580 Model 5860	1982	Commercial DP, scientific/engineering, TP	IBM 3080, 3090	14	NA	23.25	16-128	3	96	16-32	UTS/580, MVS/370, MVS/SP, MVS/XA, VM/SP, ACP, TPF	NA	NA	32	$1,630,000 (16M bytes)
Amdahl 580 Model 5867	1985	Commercial DP, scientific/engineering, TP	IBM 3080, 3090	22	NA	23.25	24-128	3	96	16-32	UTS/580, MVS/370, MVS/SP, MVS/XA, VM/SP	NA	NA	32	$2,390,000 (24M bytes)
Amdahl 580 Model 5868	1985	Commercial DP, scientific/engineering, TP	IBM 3080, 3090	22	NA	23.25	32-256	3	144	32-48	UTS/580, MVS/370, MVS/SP, MVS/XA, VM/SP	NA	NA	32	$2,850,000 (32M bytes)
Amdahl 580 Model 5870	1984	Commercial DP, scientific/engineering, TP	IBM 3080, 3090	26.6	NA	23.25	32-128	3	96	16-32	UTS/580, MVS/370, MVS/SP, MVS/XA, VM/SP	NA	NA	32	$2,770,000 (32M bytes)
Amdahl 580 Model 5880	1985	Commercial DP, scientific/engineering, TP	IBM 3080, 3090	26.6	NA	23.25	32-256	3	144	32-48	UTS/580, MVS/370, MVS/SP, MVS/XA, VM/SP	NA	NA	32	$3,180,000 (32M bytes)
Amdahl 580 Model 5890-200	1st quarter 1987	Commercial DP, scientific/engineering, TP	IBM 3090	27*	NA	15	64-256	3	192	32-64	UTS/580, MVS/SP, MVS/XA, VM/SP HPO	NA	NA	32	$3,825,000 (64M bytes)
Amdahl 580 Model 5890-300	June 1986	Commercial DP, scientific/engineering, TP	IBM 3090	36*	NA	15	64-256	3	192	32-64	UTS/580, MVS/SP, MVS/XA, VM/SP HPO	NA	NA	32	$4,500,000 (64M bytes)
Amdahl 580 Model 5890-600	4th quarter 1987	Commercial DP, scientific/engineering, TP	IBM 3090	56-75*	NA	15	128-512	3	384	64-128	UTS/580, MVS/SP, MVS/XA, VM/SP HPO	NA	NA	32	$8,500,000 (128M bytes)
Burroughs Corp. One Burroughs Place Detroit, Mich. 48232 *B7900-E, B7900 series*	1983	Commercial DP, TP	IBM 3081, 3083	3.7-16.9*	NA	125	6-144	3	NA	32-64[1]	Master Control Program (MCP)	NA	NA	52	$800,000-$2,940,000
A12	2nd quarter 1986	Commercial DP, TP	IBM 3090-150	8.6*	NA	65	24-96	3	NA	48[1]	Master Control Program/Advanced System (MCP/AS)	NA	NA	52	$1,400,000 (24M bytes)
A15-F	1985	Commercial DP, TP	IBM 3090-180	17.1*	NA	65	24-48	3	NA	32[1]	MCP	NA	NA	52	$2,920,000 (24M bytes)
A15-I	1985	Commercial DP, TP	IBM 3090-200	32.4*	NA	65	24-96	3	NA	64[1]	MCP	NA	NA	52	$4,530,000 (24M bytes)
A15-K	1st quarter 1986	Commercial DP, TP	IBM 3090-200, 3090-400	39.2*	NA	65	24-192	3	NA	64[1]	MCP	NA	NA	52	$6,080,000 (24M bytes)
A15-M	1st quarter 1986	Commercial DP, TP	IBM 3090-400	52.8*	NA	65	24-192	3	NA	64[1]	MCP	NA	NA	52	$7,625,000 (24M bytes)
Control Data Corp. 8100 34th Ave. S. Bloomington, Minn. 55420 *Cyber 180 Model 840A*	NA	Scientific/engineering	NA	3.7	NA	16	16-128	12	125	24-34	NOS, NOS/VE, NOS/BE	NA	100-200	64	$580,000 (16M bytes)
Cyber 180 Model 850A	NA	Scientific/engineering	NA	5.6	NA	16	16-128	12	125	24-34	NOS, NOS/VE, NOS/BE	NA	100-200	64	$830,000 (16M bytes)
Cyber 180 Model 860A	NA	Scientific/engineering	NA	8.5	NA	16	16-128	12	125	24-34	NOS, NOS/VE, NOS/BE	NA	150-250	64	$1,240,000 (16M bytes)

The companies included in this chart responded to a recent written survey conducted by *Computerworld*. Further product information is available from the vendors.
CW chart compiled by James Connolly and Barbara Wierzbicki.

* CW estimates based on vendor-supplied information.

[1] Data Link Processors (DLP). Burroughs uses DLPs in place of conventional channels.

[2] Dual CPU. Includes vector utilization.

	Date First Installed	Primary Market	Most Comparable DEC or IBM System	Performance in MIPS or MFLOPS	Performance (millions of Whetstones/sec.)	Machine Cycle Time (nsec)	Main Memory Range (M bytes)	Disk Transfer Rate (M bytes)	Maximum I/O Bandwidth (M bytes)	Ports/Channels	Operating System	Maximum Number of Users	Typical Number of Users	Word Length (bits)	Base Price
Cyber 180 Model 870A	NA	Scientific/ engineering	NA	15.2	NA	16	16-128	12	125	24-34	NOS, NOS/VE, NOS/BE	NA	150-250	64	$1,982,000 (16M bytes)
Cyber 180 Model 990E	NA	Scientific/ engineering	NA	42	NA	16	16-128	12	125	29-34	NOS, NOS/VE, NOS/BE	NA	200-400	64	$2,350,000 (16M bytes)
Cyber 180 Model 995E	NA	Scientific/ engineering	NA	63[2]	NA	16	16-128	12	125	29-34	NOS, NOS/VE, NOS/BE	NA	200-400	64	$3,815,000 (16M bytes)
Honeywell, Inc.'s Information Systems 200 Smith St. Waltham, Mass. 02154 *DPS 8/62 series (1-2 processors)*	1981	Commercial DP, TP	IBM 3080, 4300	1.2-5.9*	NA	NA	8-32	3	12	16-32	Honeywell GCOS 8	NA	130-230 (1-2 CPUs)	36	$550,000/ uniprocessor (8M bytes)
DPS 88/861	3rd quarter 1986	Commercial DP, TP	IBM 3090-150	5.4*	NA	NA	32-64	3	48	64	GCOS 8	NA	400	36	$1,850,000 (32M bytes)
DPS 88/862	3rd quarter 1986	Commercial DP, TP	IBM 3081-KX	9.72*	NA	NA	32-128	3	48	64	GCOS 8	NA	740	36	$2,950,000 (32M bytes)
DPS 88/862T	3rd quarter 1986	Commercial DP, TP	IBM 3081KX	9.72*	NA	NA	64-128	3	96	128	GCOS 8	NA	740	36	$4,800,000 (64M bytes)
DPS 88/891	3rd quarter 1986	Commercial DP, TP	IBM 3090-180	14.6*	NA	NA	32-64	3	48	64	GCOS 8	NA	620	36	$2,850,000 (32M bytes)
DPS 88/892	3rd quarter 1986	Commercial DP, TP	IBM 3090-200	26.3*	NA	NA	32-128	3	48	64	GCOS 8	NA	1,100	36	$4,050,000 (32M bytes)
DPS 88/892T	3rd quarter 1986	Commercial DP, TP	IBM 3090-200	26.3*	NA	NA	64-128	3	96	128	GCOS 8	NA	1,100	36	$3,700,000 (64M bytes)
DPS 90/91	1984	Commercial DP, scientific/engineering, TP	IBM 3090-180	10.8*	NA	NA	32-128	3	80	16-32	GCOS 8	NA	950	36-72	$3,950,000 (32M bytes)
DPS 90/92	1985	Commercial DP, scientific/engineering, TP	IBM 3090-200	19.4*	NA	NA	32-128	3	80	16-64	GCOS 8	NA	1,700	36-72	$5,000,000 (32M bytes)
DPS 90/92T	1984	Commercial DP, scientific/engineering, TP	IBM 3090-200	19.4*	NA	NA	64-256	3	100	32-64	GCOS 8	NA	1,700	36-72	$6,250,000 (64M bytes)
DPS 90/93	July 1986	Commercial DP, scientific/engineering, TP	IBM 3090-400	28*	NA	NA	64-256	3	100	48-64	GCOS 8	NA	2,470	36-72	$7,300,000 (64M bytes)
DPS 90/94	October 1986	Commercial DP, scientific/engineering, TP	IBM 3090-400	36.7*	NA	NA	64-256	3	100	64	GCOS 8	NA	3,230	36-72	$8,350,000 (64M bytes)
IBM Contact local market representative *3090 Model 150*	1986	Commercial DP	NA	9.2*	NA	18.5	32-64	3	NA	16-24	IBM MVS, VM, VMS/XA	NA	NA	64	$1,700,000 (32M bytes)
3090 Model 180	1986	Commercial DP	NA	14.2*	NA	18.5	32-64	3	NA	16-32	IBM MVS, VM, VMS/XA	NA	NA	64	$2,600,000 (32M bytes)
3090 Model 200	1985	Commercial DP	NA	29.3*	NA	18.5	64	3	NA	32-48	IBM MVS, VM, VMS/XA	NA	NA	64	$4,500,000 (64M bytes)
3090 Model 400	1986	Commercial DP	NA	52.7*	NA	18.5	128	3	NA	64-90	IBM MVS, VM, VMS/XA	NA	NA	64	$8,500,000 (128M bytes)
National Advanced Systems Corp. 800 E. Middlefield Road Mountain View, Calif. 94043 *AS/XL50*	NA	Commercial DP	IBM 3090	22*	NA	18	32-128	3	144	16-48	IBM MVS/XA, MVS/370	NA	NA	32	$3,050,000 (32M bytes)
AS/XL60	June 1986	Commercial DP	IBM 3090	28*	NA	18	64-256	3	192	32-64	MVS/XA, MVS/SP, VM/HPO, VM/XA	NA	NA	32	$4,356,605 (64M bytes)
AS/XL80	August 1986	Commercial DP	IBM 3090	50*	NA	18	64-256	3	192	32-64	MVS/XA, MVS/SP, VM/HPO, VM/XA	NA	NA	32	$7,227,410 (64M bytes)
AS/XL90	NA	Commercial DP	IBM 3090	67.2*	NA	18	128-512	3	288	48-96	MVS/XA, MVS/SP, VM/HPO, VM/XA	NA	NA	32	$9,916,410 (128M bytes)
AS/XL100	NA	Commercial DP	IBM 3090	81.2*	NA	18	128-512	3	288	48-96	MVS/XA, MVS/SP, VM/XA, VM/HPO	NA	NA	32	$12,690,000 (128M bytes)

LARGE SYSTEMS

	Date First Installed	Primary Market	Most Comparable DEC or IBM System	Performance in MIPS or MFLOPS	Performance (millions of Whetstones/sec.)	Machine Cycle Time (nsec)	Main Memory Range (M bytes)	Disk Transfer Rate (M bytes)	Maximum I/O Bandwidth (M bytes)	Ports/Channels	Operating System	Maximum Number of Users	Typical Number of Users	Word Length (bits)	Base Price
NCR Corp. 1334 S. Patterson Blvd. Dayton, Ohio 45479 *V-8800 series*	NA	Commercial DP	IBM 4381, 3080, 3090	1.5-12	NA	38	4-64	1.5	8-12	16-256	VRX	NA	NA	32	$480,000 (4M bytes) - $3,011,000 (16M bytes)
Sperry Corp. P.O. Box 500 Blue Bell, Pa. 19424 *1100/90 series*	1984	Commercial DP, scientific/engineering, TP	IBM 3080, 3090	5-25	NA	23	64	4.2	32.5	48	OS 1100	2,000	750	36	$2,100,000

MEDIUM-SCALE SYSTEMS

	Date First Installed	Primary Market	Most Comparable DEC or IBM System	Performance in MIPS or MFLOPS	Performance (millions of Whetstones/sec.)	Machine Cycle Time (nsec)	Main Memory Range (M bytes)	Disk Transfer Rate (M bytes)	Maximum I/O Bandwidth (M bytes)	Ports/Channels	Operating System	Maximum Number of Users	Typical Number of Users	Word Length (bits)	Base Price
AT&T One Speedwell Ave. Morristown, N.J. 07960 *AT&T 3B15*	1985	Commercial DP, transaction processing (TP), office/distributed processing	IBM System/38, 4361-4; Digital Equipment Corp. 11/780, 8300	1.6	.4[3]	133	16	1.2	3	128	AT&T Unix System V	128	32-60	32	$57,500 (2M bytes)
AT&T 3B20S	1981	TP	IBM 4361, DEC 11/780	1	.19	NA	2-16	1.2	8	256	Unix System V	256	60-100	32	$139,000 (2M bytes)
AT&T 3B20A	1983	TP	IBM 4361, DEC 11/785	1.5-1.8	.19	NA	4-32	1.2	8	256	Unix System V	256	60-100	32	$194,000 (2M bytes)
Burroughs Corp. One Burroughs Place Detroit, Mich. 48232 *A 3*	1984	Commercial DP	IBM System/38	.65*	NA	NA	3-48	1.2	NA	16[1]	Master Control Program (MCP), Master Control Program/Advanced System (MCP/AS)	NA	NA	52	$95,500-$200,000
A 5	3rd quarter 1986	Commercial DP	IBM System/38, 4381-11	1.6*	NA	NA	6-24	1.2	NA	16[1]	MCP/AS	NA	NA	52	$224,000 (6M bytes)
A 9F	1984	Commercial DP	IBM 4381-11, 4381-12	2.2*	NA	NA	12-24	3	NA	40	MCP, MCP/AS	NA	NA	52	$149,120 (12M bytes)
A 10FX	Sept. 1986	Commercial DP	IBM 4381-12, 4381-13	3*	NA	72.5	12-48	3	NA	40[1]	MCP/AS	NA	NA	52	$580,000 (12M bytes)
A 10DX	Sept. 1986	Commercial DP	IBM 4381-11, 4381-12	2*	NA	72.5	12-24	3	NA	40[1]	MCP/AS	NA	NA	52	$410,000 (12M bytes)
A 10HX	Sept. 1986	Commercial DP	IBM 4381-14	4.6*	NA	72.5	24-96	3	NA	80[1]	MCP/AS	NA	NA	52	$962,000 (24M bytes)
B2931	1981	Commercial DP, TP	IBM 4361-4	.77*	NA	NA	.5-5	3	7	32[1]	MCPIX	NA	NA	16	$59,000 (512K bytes)
B3965	1983	Commercial DP, TP	IBM 4361-4	.88*	NA	NA	2-5	3	7	32[1]	MCPIX	NA	NA	16	$120,000 (2M bytes)
V 310-1	June 1986	Commercial DP, TP	IBM 4361-4	.91*	NA	110	5-20	3	8	32[1]	MCP/VS, MCPIX	NA	NA	40	$160,000 (5M bytes)
V 310-2	June 1986	Commercial DP, TP	IBM 4361-4	.91*	NA	110	10-20	3	8	32[1]	MCP/VS, MCPIX	NA	NA	40	$210,000 (10M bytes)

CW estimates based on vendor-supplied information.

[1] Data Link Processor (DLP). Burroughs uses DLPs in place of conventional channels.

[2] Performance is 2 MIPS with dual CPU.

[3] Dual processing

[4] Per 4 bytes

Hardware Roundup/Large and Medium-Scale Systems

	Date First Installed	Primary Market	Most Comparable DEC or IBM System	Performance in MIPS or MFLOPS	Performance (millions of Whetstones/sec.)	Machine Cycle Time (nsec)	Main Memory Range (M bytes)	Disk Transfer Rate (M bytes)	Maximum I/O Bandwidth (M bytes)	Ports/Channels	Operating System	Maximum Number of Users	Typical Number of Users	Word Length (bits)	Base Price
V 340	1985	Commercial DP, TP	IBM 4381-11	1.65*	NA	110	10-40	3	8	32[1]	MCP/VS, MCPIX	NA	NA	40	$390,000 (10M bytes)
V 380	1985	Commercial DP, TP	IBM 4381-12	2.4*	NA	110	10-40	3	16	64[1]	MCP/VS, MCPIX	NA	NA	40	$702,600 (10M bytes)
Canaan Computer Corp. 39 Lindeman Drive Trumbull, Conn. 06611 *DCS 5800*	March 1986	Office/distributed processing	IBM 4361/3	5	NA	95	1-12	5	10	36	Proprietary, IBM CMS	36	16	32	$51,500 (1M byte)
Celerity Computing 9692 Via Excelencia San Diego, Calif. 92126 *C1230*	1985	Scientific/engineering	DEC 8500	10	3.25	100	4-24	2.5	16	23/2	University of California at Berkeley Unix 4.2	64	12	32	$59,000 (4M bytes)
C1260	NA	Scientific/engineering	DEC 8550/8700, 8600/8650	20	6.15	100	4-24	2.5	16	18	Unix 4.2	128	16	32	$94,000 (4M bytes)
Computer Consoles, Inc. 9801 Muirlands Blvd. Irvine, Calif. 92718 *Power 6/32S*	1st quarter 1987	Office/distributed processing	DEC VAX 8600, 8650	5	4.8	100	4-16	1.25	13.3	80	CCI System V	80	64	32	$95,000 (4M bytes)
Power 6/32	1984	Scientific/engineering, office/distributed processing	DEC VAX 8600, 8650, 8800	8	7.5	100	4-32	1.25-1.8	13.3	240	Unix 4.2, CCI System V	128	80	32	$180,000 (4M bytes)
Power 6/32 MP	4th quarter 1986	Scientific/engineering, office/distributed processing	DEC VAX 8800	15	15	100	16-128	1.25-1.8	13.3	450	CCI System V	256	160	32	$320,000 (16M bytes)
Computer Designed Systems, Inc. 10911 Olson Memorial Highway Minneapolis, Minn. 55441 *Adviser Series Model 2200/2900*	1985	TP, office/distributed processing	IBM System/38, 4300; DEC VAX, 8600	NA	NA	75	2-48	40-150	NA	16-256	AVOS (Proprietary)	4,000	160-270	64	$135,000 (12M bytes)
Concurrent Computer Corp. Two Crescent Place Oceanport, N.J. 07757 *3230XP*	1985	Commercial DP, scientific/engineering, TP, office/distributed processing	DEC VAX 8200	NA	1	260	1-16	3	20	16	OS/32, XELOS	128	64	32	$92,000 (1M byte)
3230MPS	1985	Commercial DP, scientific/engineering, TP, office/distributed processing	DEC VAX 8300, 8500	NA	1.9-5.3	200	2-16	3	20	16	OS/32	128	64	32	$140,000
3252XP	1985	Commercial DP, scientific/engineering, TP, office/distributed processing	DEC VAX 8300	NA	1.4	260	2-16	3	40	32	OS/32, XELOS	256	128	32	$176,000 (2M bytes)
3260MPS	1985	Commercial DP, scientific/engineering, TP, office/distributed processing	DEC VAX 8500, 8600	NA	2.2-9	260	2-16	3	40	32	OS/32	256	100	32	$200,000 (2M bytes)
3280MPS	April 1986	Commercial DP, scientific/engineering, TP, office/distributed processing	VAX 8650, 8800	NA	6.1-33.8	100	2-16	3	40	32	OS/32	512	100	32	$250,000 (2M bytes)
Control Data Corp. 8100 34th Ave., S. Bloomington, Minn. 55420 *Cyber 180 Model 810A*	NA	Scientific/engineering	NA	.8	NA	50	8-64	1.81	40	8-16	NOS, NOS/VE, NOS/BE	NA	50-150	64	$121,000 (8M bytes)

MEDIUM-SCALE SYSTEMS

	Date First Installed	Primary Market	Most Comparable DEC or IBM System	Performance in MIPS or MFLOPS	Performance (millions of Whetstones/sec.)	Machine Cycle Time (nsec)	Main Memory Range (M bytes)	Disk Transfer Rate (M bytes)	Maximum I/O Bandwidth (M bytes)	Ports/Channels	Operating System	Maximum Number of Users	Typical Number of Users	Word Length (bits)	Base Price
Cyber 180 Model 830A,	NA	Scientific/ engineering	NA	1.2[2]	NA	50	16-64	1.81	40	8-16	NOS, NOS/VE, NOS/BE	NA	50-150	64	$175,000 (16M bytes)
Cyber 180 Model 840A, 850A	NA	Scientific/ engineering	NA	3.7-5.6	NA	16	16-128	12	125	24-34	NOS, NOS/VE, NOS/BE	NA	100-200	64	$580,000-$830,000 (16M bytes)
Cyber 180 Model 860A, 870A	NA	Scientific/ engineering	NA	8.5-15.2	NA	16	16-128	12	125	24-34	NOS, NOS/VE, NOS/BE	NA	150-250	64	$1,240,000-$1,982,000 (16M bytes)
Convergent Technologies, Inc. 2314 N. First St. San Jose, Calif. 95131 *S/320*	1985	Office/ distributed processing	DEC VAX 8500	1	.81K	320	1-16	.5-2.4	12	42	CTIX-Unix System 5.2.2	32	24-32	32	$15,500 (1M byte)
S/640	4th quarter 1986	Office/ distributed processing	DEC VAX 8600	4	NA	NA	1-64	.5-2.4	12	160	CTIX-Unix 5.3	64	NA	32	$28,000
S/1280	1984	Office/ distributed processing	DEC VAX 8600	2.2-8.8	1	NA	2-24	.5-1.2	13	128	CTIX-Unix 5.2.2	128	32-64	32	$32,000
Data General Corp. 4400 Computer Drive Westboro, Mass. 01580 *Eclipse MV/10000*	1983	Commercial DP, office/ distributed processing	IBM 4381-12, DEC VAX 8500	3.2	3.2	140	32	2.2	28.6	192	AOS/VS, AOS/DVS, DG/UX	117	50-117	32	$167,100 (4M bytes)
Eclipse VM/20000 Model 1	1985	Commercial DP, office/ distributed processing	IBM 4381-14, DEC VAX 8550	6.4	6.4	85	64	2.2	35	1008	AOS/VS, AOS/DVS, DG/UX	211	117-211	32	$234,000 (4M bytes)
Eclipse MV/20000 Model 2	1985	Commercial DP, office/ distributed processing	DEC VAX 8800	12.4	12.4	85	64	2.2	35	1008	AOS/VS, AOS/DVS, DG/UX	379	211-379	32	$337,000 (4M bytes)
Digital Equipment Corp. 200 Forest St. Marlboro, Mass. 01752 *VAX 8300*	March 1986	Commercial DP, scientific/engineering, TP, office/ distributed processing	IBM 4361-5	1.9*	NA	200	4-24	1	13.3	NA	VMS	NA	24-96	32	$109,000 (12M bytes)
VAX 8500	April 1986	Commercial DP, scientific/engineering, TP, office/ distributed processing	IBM 4381-12	3*	NA	45	20-80	1	16	NA	VMS	NA	48-192	32	$260,000 (20M bytes)
VAX 8600	1985	Commercial DP, scientific/engineering, office/ distributed processing	IBM 4381-3, 3083-EX	4.2	4.7	80	68	NA	20	NA	VMX Ultrix-32	400	56-256	32	$350,000 (4M bytes)
VAX 8550	August 1986	Commercial DP, scientific/engineering, TP, office/ distributed processing	IBM 4381-13	6*	NA	45	20-80	1	16	NA	VMS	NA	72-320	32	$364,000 (20M bytes)
VAX 8650	1985	Commercial DP, scientific/engineering, office/ distributed processing	IBM 4381-3, 3083-BX	6.2	6.8	55	68	NA	26	NA	VMS Ultrix-32	500	72-320	32	$400,000 (16M bytes)
VAX 8700	August 1986	Commercial DP, scientific/engineering, TP, office/ distributed processing	IBM 4381-13	6*	NA	45	32-128	1	30	NA	VMS	NA	72-320	32	$433,000 (32M bytes)

Hardware Roundup/Large and Medium-Scale Systems

	Date First Installed	Primary Market	Most Comparable DEC or IBM System	Performance in MIPS or MFLOPS	Performance (millions of Whetstones/sec.)	Machine Cycle Time (nsec)	Main Memory Range (M bytes)	Disk Transfer Rate (M bytes)	Maximum I/O Bandwidth (M bytes)	Ports/Channels	Operating System	Maximum Number of Users	Typical Number of Users	Word Length (bits)	Base Price
VAX 8800	February 1986	Commercial DP, scientific/engineering, TP, office/distributed processing	IBM 4381-14	12*	NA	45	32-128	1	30	NA	VMS	NA	108-480	32	$650,000 (32M bytes)
Gould, Inc.'s Computer System Division 6901 W. Sunrise Blvd. Fort Lauderdale, Fla. 33313 *Powernode 6000 series 6000, 6040, 6050, 6080)*	1984	Scientific/engineering	DEC VAX 11/780	NA	1.3	150	4-16	NA	26.6	128	UTX/32, UTX/32S	128	48	32	$38,900-$145,000
Powernode 9000 series (9001, 9050, 9080)	1985	Scientific/engineering	DEC VAX 8600	NA	4.2	75	4-16	NA	26.6	128	UTX/32, UTX/32S	128	96	32	$245,000-$355,000
Concept 32/67	1981	Scientific/engineering	DEC VAX 11/780	NA	1.8-3.4	150	NA	NA	1.5	124	MPX/32	64	NA	32	$99,000-$145,000
Concept 32/87	1981	Scientific/engineering	NA	NA	4.6-5.5	75	2-16	NA	1.5	124	MPX/32	64	NA	32	$230,000-$370,000
Concept 32/97	1984	Scientific/engineering	DEC VAX 8600	NA	4.6-10.7	75	4-16	NA	1.5	124	MPX/32	64	NA	32	$245,000-$516,000
Harris Computer Systems Division 2101 W. Cypress Creek Road Fort Lauderdale, Fla. 33309 *Harris 700*	1983	Scientific/engineering	NA	NA	.88	300	12	1.8	19	24	VOS, RT-VOS, VUE (Proprietary)	128	60-80	48	$56,000 (768K bytes)
Harris MCX-5, Model 70	1st quarter 1986	Scientific/engineering	DEC VAX 8300	14 million floating-point operations per second (MFLOPS)	14	60	32	1.86	24	26	HS/UX	64	20-40	32	$73,000
Harris 800	1980	Scientific/engineering	NA	NA	1.6	150	12	1.8	19	31	VOS/RT-VOS/VUE	128	80-110	48	$164,000 (768K bytes)
Harris HCX-7	January 1986	Scientific/engineering	DEC VAX 8650	.96 MFLOPS	7.6	100	2-32	1.8	11	235	HCX/UX 2.2	235	NA	32	$202,500 (2M bytes)
Harris 1000	1984	Scientific/engineering	NA	4.8	4.8	75	12	1.8	19	31	VOS, RT-VOS, VUE	192	110-160	48	$251,000 (1.5M bytes)
Harris 1200	1985	Scientific/engineering	NA	5	5	75	12	1.8	19	31	VOS, RT-VOS, VUE	224	140-200	48	$294,000 (1.5M bytes)
Hewlett-Packard Co. Contact local HP sales office *HP 3000 Series 58*	1985	Commercial DP, TP, office/distributed processing	IBM System/38-600	.57	420	105	4-8	1	3.5	152/5	MPE V	152	60	16	$75,000 (4M bytes)
HP 9000 Series 800 Model 840	4th quarter 1986	Scientific/engineering	DEC VAX 8600	4.5	2.8	125	8-24	1.2	5	60	AT&T Unix System V/HP-UX	60	30-40	32	$115,000 (8M bytes)
Series 70	May 1986	Commercial DP, TP, office/distributed processing	IBM 4381-11	1.7	1.1	75	8-16	1	10.5	400/15	MPE V	400	NA	16	$150,000 (8M bytes)
Series 930	NA	Commercial DP, TP, office/distributed processing	IBM 4381-12, DEC VAX 8600	4-2	1.6	125	16-24	1	15	400/14	MPE XL	400	200	48	$186,500 (16M bytes)
Honeywell, Inc.'s Information Systems 200 Smith St. Waltham, Mass. 02154 *DPS 6 Plus Model 410 (1-4 CPUs)*	Sept. 1986	Commercial DP, TP, office/distributed processing	NA	1-4	NA	300	64	1.2-1.8	NA	76	HVS 6 Plus	64	25-50	32	$57,000
DPS 6/85-1	April 1986	Commercial DP, TP, office/distributed processing	NA	1.2*	NA	300	4-8	1.2-1.8	NA	86	GCOS 6, VCOS III	64	25-50	32	$62,000
DPS 6/95-1	April 1986	Commercial DP, TP, office/distributed processing	NA	1.8*	NA	300	4-16	1.2-1.8	NA	150	GCOS 6, VCOS III	160	35-80	32	$86,000

MEDIUM-SCALE SYSTEMS

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DPS 7/40E	April 1986	Commercial DP, TP, office/distributed processing	IBM System/38-300	.66*	NA	NA	2-6	1.8	11	2-6	GCOS 7	NA	25-100	32	$89,000 (2M bytes)
DPS 6 Plus Model 420 (1-4 CPUs)	Sept. 1986	Commercial DP, TP, office/distributed processing	NA	1-4	NA	300	64	1.2-1.8	NA	184	HVS 6 Plus	160	60-120	32	$93,000
DPS 6/98-1	April 1986	Commercial DP, TP, office/distributed processing	NA	1.8*	NA	300	4-16	1.2-1.8	NA	146	GCOS 6, VCOS III	160	40-90	32	$98,000
DPS 7/55E	1983	Commercial DP, TP, office/distributed processing	IBM System/38-400, System/38-600	1*	NA	NA	2-8	1.8	11	4-8	GCOS 7	NA	50-200	32	$120,000 (2M bytes)
DPS 6/95-2	April 1986	Commercial DP, TP, office/distributed processing	NA	3	NA	300	4-16	1.2-1.8	NA	150	GCOS 6, VCOS III	160	50-110	32	$126,600
DPS 6/98-2	April 1986	Commercial DP, TP, office/distributed processing	NA	3*	NA	300	4-16	1.2-1.8	NA	146	GCOS 6, VCOS III	160	60-120	32	$138,000
DPS 8/47 series (1-2 processors)	1983	Commercial DP, TP	IBM 4381-11, 4381-12	.73-1.2*	NA	NA	4-32	1.2	5	10-25	GCOS 8	NA	65-117	36	$153,000/uniprocessor (4M bytes)
DPS 7/65E	1983	Commercial DP, TP, office/distributed processing	IBM System/38-600, System/38-700	1.36*	NA	140	2-8	1.8	11	4-8	GCOS 7	NA	150-300	32	$160,000 (2M bytes)
DPS 8/49 series (1-4 processors)	1983	Commercial DP, TP	IBM 4381-12, 4381-13	1.1-4.5	NA	NA	4-32	1.2	5	10-25	GCOS 8	NA	95-340	36	$235,000-$672,600 (4M bytes)
DPS 8/52 series (1-2 processors)	1980	Commercial DP, TP	IBM 4381-11, 4381-12, 4381-13	1.1-4.9*	NA	NA	8-32	3	12	16-32	GCOS 8	NA	95-170	36	$450,000/uniprocessor (8M bytes)
DPS 8/70 series (1-4 processors)	1980	Commercial DP, TP	IBM 4381, 3090, 3081	1.8-7.2*	NA	NA	8-64	3	12	16-64	GCOS 8	NA	170	36	$700,000/uniprocessor (8M bytes)
IBM Old Orchard Road Armonk, N.Y. 10504 *4361-3*	1984	Commercial DP, scientific/engineering	NA	.38*	NA	100[4]	2-4	2-3	NA	1-3	IBM SSX/VSE, VSE/SP, VSI, VM, MVS	NA	NA	32	$39,600 (2M bytes)
4361 Models 4, 5	1984	Commercial DP, scientific/engineering	NA	.79-1.14*	NA	100[4]	2-16	2-3	NA	1-3	IBM SSX/VSE, VSE/SP, VSI, VM, MVS	NA	NA	32	$192,250 (16M bytes)
System/38 5382-700	Sept. 1986	Commercial DP, office/distributed processing	NA	1.2*	NA	NA	16-32	1-3	10	12	IBM Control Program Facility (CPF)	256	NA	32	$252,500 (16M bytes)
4381-11	1986	Commercial DP, scientific/engineering	NA	1.5*	NA	68	4-16	1-3	NA	6-12	IBM MVS, VM, OS/VSI, VSE	NA	NA	32	$185,000 (4M bytes)
4381-12	1986	Commercial DP, scientific/engineering	NA	2.8*	NA	68	8-32	1-3	NA	6-12	IBM MVS, VM, OS/VSI, VSE	NA	NA	32	$330,000 (8M bytes)
4381-13	1986	Commercial DP, scientific/engineering	NA	3.5*	NA	56	8-32	1-3	NA	6-12	IBM MVS, VM, OS/VSI, VSE	NA	NA	32	$440,000 (8M bytes)

Hardware Roundup/Large and Medium-Scale Systems

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4381-14	1986	Commercial DP, scientific/engineering	NA	6*	NA	56	32-64	1-3	NA	12-18	IBM MVS, VM, OS/VSI, VSE	NA	NA	32	$855,000 (32M bytes)
ICL Co. Wenlock Way Manchester, England M12 5DR *Series 39 Level 20/1*	August 1986	Commercial DP, TP, office/distributed processing	IBM System/38-400, DEC 8200	NA	1.5	190	4-12	2.4	NA	3	VME (Proprietary)	4,000	150	32	$87,000 (4M bytes)
Series 39 Levels 30/1, 30/2	1984	Commercial DP, TP, office/distributed processing	IBM System/38-700, DEC 8300	NA	2.2-4.2	190	4-32	3	NA	3-10	VME	4,000	220-400	32	$131,000 (4M bytes) - $314,000 (16M bytes)
Series 39 Level 50/1	August 1986	Commercial DP, TP	IBM 4381-12, DEC 8600	NA	3	25	16-32	3	NA	3-6	VME	4,000	550	32	$536,000 (16M bytes)
Series 39 Levels 60/1, 60/2	August 1986	Commercial DP, TP	IBM 4381-14, DEC 8800	NA	7.1-13.5	25	16-96	3	NA	3-18	VME	4,000	1,200-2,200	32	$818,000 (16M bytes) - $1,681,000 (32M bytes)
Series 39 Levels 80/1, 80/2	1985	Commercial DP, scientific/engineering, TP	IBM 3090-180	NA	17.5-34	25	16-128	3	NA	3-18	VME	4,000	1,800-3,200	32	$1,396,000 (16M bytes) - $2,833,000 (32M bytes)
Masscomp Co. One Technology Park Westford, Mass. 01886 *MC5700*	1985	Scientific/engineering	8600	2.5-10 (1-4 CPUs)	1-12 (1-4 CPUs)	59	4-32	4.8	24	64	RTU (Proprietary)	64	16-64	32	$50,000
McDonnell Douglas Computer Systems Co. 2nd Floor 4000 W. MacArthur Blvd. Newport Beach, Calif. 92660 *M9200 series*	1985	Commercial DP	IBM System/38	.77*	NA	NA	1-8	NA	NA	16-208	Reality (Proprietary)	208	64	32	$89,950 (1M byte)
MDS Qantel, Inc. 4142 Point Eden Way Hayward, Calif. 94545 *System 78*	March 1986	TP	IBM System/38	NA	NA	50	2-16	NA	NA	16	BEST/AOS (Proprietary)	150	40-50	8	$59,950 (2M bytes)
Modular Computer Systems, Inc. 1650 W. McNab Road Fort Lauderdale, Fla. 33310 *Classic II/75*	1982	Scientific/engineering	NA	1	NA	200	4	NA	NA	32-64	MAX IV (Proprietary)	256	NA	16	$86,600 (1M byte)
Classic 32/85	1984	Scientific/engineering	NA	2.4	NA	110	Up to 256	NA	NA	32-64	MAX 32, MAX IV	256	NA	32	$148,500
National Advanced Systems Corp. 800 E. Middlefield Road Mountain View, Calif. 94039 *AS/6600 series*	1982	Commercial DP, scientific/engineering, TP, office/distributed processing	IBM 4341	1.6-28*	NA	43-60	8-16	3	22	5-12	IBM VSE, VSI, VM, MVS, DOS	NA	NA	24	$255,000 (8M bytes)
AS/8023, 8043, 8053, 8063, 8083	1984	Commercial DP, scientific/engineering, TP, office/distributed processing	IBM 4381 MG 13, 14	3.3-17.1*	NA	33-35	16-128	3	60	8-32	IBM MVS/XA, VM/XA, VSI, VM, MVS, DOS	NA	NA	31	$475,000 (16M bytes)
NCR Corp. 1334 S. Patterson Blvd. Dayton, Ohio 45479 *V-8500 family*	NA	Commercial DP	IBM 4300 series	.33-.77	NA	56-84	1-16	1.5	12-16	Up to 64	VRX (Proprietary)	NA	NA	32	$41,500 (1M byte) - $170,000 (4M bytes)
V-8600 family	NA	Commercial DP	IBM 4300, 30 series	1-7.6	NA	38	4-64	1.5	8	16-256	VRX	NA	NA	32	$225,000-$2,460,000
V-9811	NA	Commercial DP, special purpose	IBM 4300 series	.6	NA	150	2-16	1.2	10	14-28	VRX/E	NA	NA	32	$41,220 (2M bytes)
V-9821	NA	Commercial DP, special purpose	IBM 4300 series	1	NA	150	4-32	1.2	14	14-28	VRX/E	NA	NA	32	$61,400 (4M bytes)

MEDIUM-SCALE SYSTEMS

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V-9822	NA	Commercial DP, TP, fault tolerance	IBM 4300 series	1.3	NA	150	4-32	1.2	14	14-28	VRX/E	NA	NA	32	$81,250 (4M bytes)
V-9832	NA	Commercial DP, TP, fault tolerance	IBM 4300 series	1.7	NA	150	6-48	1.2	16	21-42	VRX/E	NA	NA	32	$145,610
V-9842	NA	Commercial DP, TP, fault tolerance	IBM 4300 series	2	NA	150	8-64	1.2	18	28-56	VRX/E	NA	NA	32	$173,160 (16M bytes)
V-9863	NA	Commercial DP, TP, fault tolerance	IBM 4300 series	3	NA	150	12-96	1.2	22	42-84	VRX/E	NA	NA	32	$256,870
V-9884	NA	Commercial DP, TP, fault tolerance	IBM 4300 series	4	NA	150	16-128	1.2	26	56-112	VRX/E	NA	NA	32	$340,580
Norsk Data AS Suite 150 1800 W. Park Drive Westboro, Mass. 01581 *ND-500/CX Series 510*	1983	Scientific/ engineering, office/ distributed processing	DEC 730	.4	NA	120	2-9	1.2	4	1	Sintran III (Proprietary)	128	30-40	32	$85,000 (2M bytes)
ND-500/CX Series 530	1983	Scientific/ engineering, office/ distributed processing	DEC 750	.6	NA	120	2-73	1.2	4	1-3	Sintran III	128	30-40	32	$128,000 (2M bytes)
ND-500/CX Series 550	1983	Scientific/ engineering, office/ distributed processing	DEC 780	1.3	NA	120	2-73	1.2	4	1-3	Sintran III	128	30-40	32	$164,000 (2M bytes)
ND-500/CX Series 560	1983	Scientific/ engineering, office/ distributed processing	DEC VAX-11/780	2.1	NA	120	2-73	1.2	4	1-3	Sintran III	128	30-40	32	$250,000 (3M bytes)
ND-500/CX Series 570	1983	Scientific/ engineering, office/ distributed processing	DEC 8600	3.3	NA	120	2-73	1.2	4	1-3	Sintran III	128	30-40	32	$371,500 (3M bytes)
Prime Computer, Inc. Prime Park Natick, Mass. 01760 *9655*	1985	Commercial DP, scientific/engineering, TP, office/distributed processing	DEC VAX 8300	1.3	NA	132	2-8	1.8	5	136	Primos	128	NA	32	$142,100 (4M bytes)
9755	1986	Commercial DP, scientific/engineering, TP, office/distributed processing	DEC VAX 8500	3.4	NA	80	8-16	1.8	9	200	Primos	192	NA	32	$258,600 (8M bytes)
9955II	1986	Commercial DP, scientific/engineering, TP, office/distributed processing	DEC VAX 8650	5	NA	64	16-32	1.8	9.5	262	Primos	254	NA	32	$392,600 (16M bytes)
Plexus Computers, Inc. 3833 N. First St. San Jose, Calif. 95134 *P/55*	May 1986	Commercial DP	DEC VAX 11/785	2	182K	80	1-8	1.2	4	36	AT&T Unix System V.2	32	24	32	$25,250 (1M byte)
P/75	March 1986	Commercial DP	DEC VAX 11/785, IBM 4341	2	182K	80	1-16	2.4	4	85	Unix System V.2	80	64	32	$36,000 (1M byte)

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Hardware Roundup/Large and Medium-Scale Systems

	Date First Installed	Primary Market	Most Comparable DEC or IBM System	Performance in MIPS or MFLOPS	Performance (millions of Whetstones/sec.)	Machine Cycle Time (nsec)	Main Memory Range (M bytes)	Disk Transfer Rate (M bytes)	Maximum I/O Bandwidth (M bytes)	Ports/Channels	Operating System	Maximum Number of Users	Typical Number of Users	Word Length (bits)	Base Price
P/60	1983	Commercial DP	DEC VAX 11/785	2	182K	80	1-16	1.9	4	85	Unix System V.2	80	64	32	$42,950 (.5M byte)
Point 4 Data Corp. 15442 Del Amo Tustin, Calif. 92680 *Point 4 Mark 12*	1985	Commercial DP	NA	15.6	NA	64	128K-16	1.2	33.3	128	IRIS	128	80	16	$21,600 (128K bytes)
Pyramid Technology Corp. P.O. Box 7295 1295 Charleston Road Mountain View, Calif. 94039 *Workcenter (Single CPU)*	June 1986	Office/distributed processing	DEC 8500	3.2	NA	100	4-8	1.8	11	32	Dualport OSx (Proprietary)	32	32	32	$58,675
98XE (Single CPU)	1985	Office/distributed processing	DEC 8600	3.2	NA	100	4-32	1.8	11	256	Dualport OSx	256	64	32	$110,900
98X (Dual CPU)	1985	Office/distributed processing	DEC 8700	5.4	NA	100	8-32	1.8	11	256	Dualport OSx	256	96	32	$172,300
Sperry Corp. P.O. Box 500 Blue Bell, Pa. 19424 *System 80 Model 8*	1983	Commercial DP, TP	IBM 4300	.7	NA	120	1-8	1.5	8	5	OS/3 (Proprietary)	48	40	32	$123,000 (1M byte)
Series 7000, Model 40	1984	Office/distributed processing	IBM RT Personal Computer, System/36; DEC VAX, Microvax	7.7	NA	100	4-32	NA	11.4	255	AT&T Unix System V	128	128	32	$160,000 (16M bytes)
System II/Mapper 10	1984	Commercial DP	IBM 4361-3, System/38	.35-.7	NA	100	4-16	2	5.2	7	OS 1100	NA	10-35	36	$182,000 (8M bytes)
1100/70	1984	Commercial DP, scientific/engineering, TP	IBM 4341, 4381	.50-5.6	1.88	116	32	3.2	7.6	24	OS 1100	750	250	36	$360,000
Systems Concepts, Inc. 55 Francisco St. San Francisco, Calif. 94133 *SC-20*	1986	Scientific/engineering	Decsystem-10, Decsystem-20	1.85	NA	160	4.5-36	3	12	4	DEC TOPS-10, TOPS-20	85-125	10-50	36	$200,000 (4.5M bytes)
SC-30M	1985	Scientific/engineering	Decsystem-10, Decsystem-20	3.75	NA	80	4.5-144	3	25	8	DEC TOPS-10, TOPS-20	700-1,000	20-200	36	$500,000 (18M bytes)
Texas Instruments, Inc. P.O. Box 809063 Dallas, Texas 79380 *Business System 1500*	March 1986	Commercial DP	IBM System/38; DEC 8300, 8600	2.5	NA	180	2-20	4	4	10	AT&T Unix System V	128	128	32	$70,000
The Ultimate Corp. 717 Ridgedale Ave. East Hanover, N.J. 07936 *6000 series*	1985	Commercial DP	IBM System/36, System/38, 4381	NA	NA		2-8	1.2-8	NA	8-32	Proprietary	32-256	NA	16	$35,300 - $179,000
7000 series	June 1986	Commercial DP	IBM 4381	NA	NA		8	1.8	NA	32-128	Proprietary	400	NA	32	$310,000 - $545,000
Wang Laboratories, Inc. One Industrial Ave. Lowell, Mass. 01851 *VS 100*	1981	Commercial DP, office/distributed processing	IBM System/38, 4300; DEC VAX 8500	NA	NA	160	2-16	1.2	NA	16	VS/OS (Proprietary)	128	100	32	$99,750 (2M bytes)
VS 300	1985	Commercial DP, office/distributed processing	IBM System/38, 4300; DEC VAX 8550	NA	NA	120	4-16	1.8	NA	15	VS/OS	192	150	32	$178,500 (4M bytes)

SPECIAL-PURPOSE COMPUTERS

	Date First Installed	Primary Market	Most Comparable DEC or IBM System	Performance in MIPS or MFLOPS	Performance (millions of Whetstones/sec.)	Machine Cycle Time (nsec)	Main Memory Range (M bytes)	Disk Transfer Rate (M bytes)	Maximum I/O Bandwidth (M bytes)	Ports/Channels	Operating System	Maximum Number of Users	Typical Number of Users	Word Length (bits)	Base Price
Alliant Computer Systems Corp. One Monarch Drive Littleton, Mass. 01460 *FX/1, FX/8*	July 1985	Scientific/ engineering	Digital Equipment Corp. VAX 8800 series, IBM 3090-VF	11.7-94.4	4.1	170	8-80	2	2	12	Concentrix (Proprietary)	128	32-64	64	$99,500-$270,000 (8M bytes)
Amdahl Corp. 1250 E. Arques Ave. Sunnyvale, Calif. 94086 *Amdahl 500 Vector Processor*	NA	Scientific/ engineering	IBM 3090-180	133 million floating-point operations per second (MFLOPS)	NA	7.5 (vector)	32-128	3	192	16/32	MVS/XA	NA	NA	32/64	$5,000,000 (64M bytes) - $7,300,000 (128M bytes)
Amdahl 1100 Vector Processor	July 1985	Scientific/ engineering	IBM 3090-200	267 MFLOPS	NA	7.5 (vector)	32-128	3	192	16/32	MVS/XA	NA	NA	32/64	$6,200,000 (64M bytes) - $8,500,000 (128M bytes)
Amdahl 1200 Vector Processor	1984	Scientific/ engineering	IBM 3090-400	533 MFLOPS	NA	7.5 (vector)	64-256	3	192	16/32	MVS/XA	NA	NA	32/64	$8,100,000 (64M bytes) - $14,400,000 (256M bytes)
Amdahl 1400 Vector Processor	NA	Scientific/ engineering	NA	1,142 MFLOPS	NA	7	64-256	3	192	16/32	MVS/XA	1200	NA	32/64	$10,900,000 (64M bytes) - $17,200,000 (256M bytes)
Convex Computer Corp. 701 Plano Road Richardson, Texas 75081 *Convex C-1*	1984	Scientific/ engineering	Beyond VAX 8800	40 MFLOPS	NA	100	Up to 128	4	80	1-5	Unix	128	32	64/32	$495,000 (16M bytes)
Cray Research, Inc. 608 Second Ave., S. Minneapolis, Minn. 55060 *Cray X-MP series*	1982	Scientific/ engineering	IBM 3090	Up to 1.26 GFLOPS	NA	8.5	32-128	12	NA	4/processor	UNICOS, COS (Proprietary)	NA	NA	64	$4,000,000 (8M bytes) - $16,000,000 (128M bytes)
Cray-2	1985	Scientific/ engineering	IBM 3090	2 GFLOPS	NA	4.1	2G bytes	12	NA	4/processor	UNICOS, COS	NA	NA	64	$17,000,000 (2G bytes)
Culler Scientific Systems Corp. 100 Burns Place Santa Barbara, Calif. 93117 *Culler PSC*	NA	Scientific/ engineering	NA	18	8-9K	180	8-16	NA	NA	NA	CSD (Proprietary)	NA	NA	8-64	$98,000 (8M bytes)
Elxsi Co. 2334 Lundy Place San Jose, Calif. 95131 *System 6400, M6400-20*	NA	Scientific/ engineering	DEC VAX 8650, IBM 4381-12	11-132	NA	50	16-768	Up to 2.4	16	Up to 8	EMBOS (Proprietary), AT&T Unix System V, University of California at Berkeley Unix 4.2	1,000	NA	64	$399,000 (16M bytes)
System 6400, M6400	1983	Scientific/ engineering	DEC VAX 8650, IBM 4381-12	7-84	NA	50	16-768	Up to 2.4	16	Up to 8	EMBOS, Unix System V, Unix 4.2	1,000	48	64	$339,000 (16M bytes)
Encore Computer Corp. 257 Cedar Hill St. Marlboro, Mass. 01752 *Multimax Multiprocessor System*	1985	Scientific/ engineering, transaction processing (TP)	DEC VAX family	1.5-15 (2-20 CPUs)	.8-8 (2-20 CPUs)	80	4-128	100	15	Up to 10	University of California at Berkeley Unix 4.2, AT&T Unix System V	200	30-70	32	$65,000 (4M bytes, 2 CPUs)
Flexible Computer Corp. P.O. Box 299005 Dallas, Texas 75229 *Flex/32 Multicomputer Series 600, 1200*	1985	Scientific/ engineering, real time	NA	4-8 MFLOPS	NA	50	25-58	2.4	40-80	4-8	AT&T Unix System V, MMOS	80-160	10-30	32	$88,000 (8M bytes) - $148,000 (12M bytes)
Flex/32 Multicomputer Series 2000, 3000	1985	Scientific/ engineering, real time	NA	10-20 MFLOPS	NA	50	44.5-89.5	2.4	100-200	10-20	Unix System V, MMOS	160-400	30-60	32	$265,000 - $330,000 (24M bytes)
Flex/32 Multicomputer Series 6000	1985	Scientific/ engineering, real time	NA	40 MFLOPS	NA	50	Up to 321	2.4	400	40	Unix System V, MMOS	600-800	80-100	32	$840,000 (30M bytes)

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[4] Performance is measured in transactions per second.

Hardware Roundup/Large and Medium-Scale Systems

	Date First Installed	Primary Market	Most Comparable DEC or IBM System	Performance in MIPS or MFLOPS	Performance (millions of Whetstones/sec.)	Machine Cycle Time (nsec)	Main Memory Range (M bytes)	Disk Transfer Rate (M bytes)	Maximum I/O Bandwidth (M bytes)	Ports/Channels	Operating System	Maximum Number of Users	Typical Number of Users	Word Length (bits)	Base Price
Floating Point Systems, Inc. 3601 S.W. Murray Road Beaverton, Ore. 97005 *FPS-M64 series, M-32 family, FPS-T series*	1982	Scientific/engineering	NA	6 MFLOPS-65 GFLOPS	2.5-21	52	8-128	1.81-44	NA	7	SJE (Proprietary)	NA	8	64	$98,000-$640,000
Gould, Inc.'s Computer Systems Division 6901 W. Sunrise Blvd. Fort Lauderdale, Fla. 33313 *Concept 32/27*	1980	Scientific/engineering	NA	NA	.76	150	1-16	NA	1.5	124	MPX-32	64	NA	32	$46,500-$65,000
National Advanced Systems Corp. 800 E. Middlefield Road Mountain View, Calif. 94039 *AS/91X0 series: Models AS/9140, AS/9150, AS/9160, AS/9170, AS/9180*	1984	Scientific/engineering	IBM 3080	13-17 MFLOPS	NA	30-38	16-64	3	40-144	8-48	VM, MVS, VS/I, ACP, DOS, DOS/VSE, VM/SP, MVS/SE, MVS/XA	NA	NA	32	$1,920,000 (16M bytes)
AS/XL Vector series: Models AS/XL V50, V60, V80,V90, V100 (1 to 4 processors)	4th quarter 1986	Scientific/engineering	IBM 3090 VF	43 MFLOPS	NA	18	32-512	3	48-288	16-96	VM/XA, MVS/XA, MVS/SP, VM/HPO, MVS/370	NA	NA	32	$3,612,000 (32M bytes)
Ridge Computers Co. 2451 Mission College Blvd. Santa Clara, Calif. 95054 *Ridge Server/RT*	1985	Scientific/engineering	DEC VAX 8300	2	2.1	125	4-16	2.4	10.7	16	AT&T Unix System V	32	16	32	$30,650 (4M bytes)
Ridge 3200 Model 90	August 1986	Scientific/engineering	DEC VAX 8600	4.3	4.3	83.3	4-128	2.4	18	16	Unix System V	64	24	32	$36,650 (4M bytes)
Sequent Computer Systems, Inc. 15450 S.W. Koll Pkwy. Beaverton, Ore. 97006-6063 *Balance 8000, Balance 21000*	1985	Commercial DP, scientific/engineering, TP, office/distributed processing	DEC VAX family	1.5 to 21	.82-12.3	100	2-28	2.4	26	8	Multiprocessing Unix	256	16-64	32	$60,000
Stratus Computer, Inc. 55 Fairbanks Blvd. Marlboro, Mass. 01752 *Stratus/32 FT200*	1982	TP, fault tolerant	DEC VAX 8200	.7	NA	125	4-16	1.25	16	15	VOS, Unix (option)	128	32	32	$115,000 (8M bytes)
Stratus/32 XA400	1984	TP, fault tolerant	DEC VAX 8500	2	NA	125	4-64	1.25	16	15	VOS, Unix (option)	250	60	32	$170,000 (4M bytes)
Stratus/32 XA600	1984	TP, fault tolerant	DEC VAX 8650	3	NA	125	4-64	1.25	16	15	VOS, Unix (option)	256	100	32	$275,000 (8M bytes)
Tandem Computers, Inc. 19333 Vallco Pkwy. Cupertino, Calif. 95014 *Nonstop II*	1981	Commercial DP, TP, office/distributed processing	NA	4-32[4]	NA	100	4-256	1.8	5	2-16	Guardian 90 (Proprietary)	NA	NA	16	$155,000 (4M bytes)
Nonstop EXT25	3rd quarter 1986	Commercial DP, TP, office/distributed processing	NA	11-22[4]	NA	83	16-64	1.8	5	2-4	Guardian 90	360	360	32	$325,000 (16M bytes)
Nonstop TXP	1983	Commercial DP, TP, office/distributed processing	NA	11-88[4]	NA	83	16-256	1.8	5	2-16	Guardian 90	NA	NA	32	$399,000 (16M bytes)
Nonstop VLX	April 1986	Commercial DP, TP, office/distributed processing	NA	40-160[4]	NA	83	32-256	1.8	5	4-16	Guardian90	NA	NA	32	$995,275 (32M bytes)
Tolerant Systems, Inc. 81 E. Daggett Drive San Jose, Calif. 95134 *Eternity series: P100*	1984	TP	IBM System/88-40, DEC VAX 8600	2.1-2.8	4[4]	NA	4-12	3	6	1-2	TX (Proprietary)	7,500	NA	32	$43,700
Eternity series: P200	1985	TP	IBM System/88-60, DEC VAX 8600	3-4	5.8[4]	NA	4-12	3	6	1-2	TX	7,500	NA	32	$56,450

In Depth

Twelve DP myths that just won't die

Excuses for skipping cost/benefit analyses • Schemes to avoid chargeback • Phone lines as scapegoats

By J. ROBERT RIGGS

As in any area of social interaction, a number of myths have grown up within the computer industry. These myths persist, despite compelling evidence that they should be discarded along with transistors, diodes and copper wire. I find the survival of these myths hard to fathom. They may survive in part because they have not been challenged publicly and subjected to analysis and debate. A body of self-governing laws or rules has not evolved from the computer industry as it has in other disciplines.

This article will describe a few myths of the computer industry and let readers decide which ones, if any, are worthy of public review and debate. The issues brought up in these myths may be of sufficient interest to spark a lively debate, leading to greater understanding of some of the key issues in information management.

Myth #1. The use of computer-based systems for commercial and technical applications is good per se and thus does not require cost/benefit analysis for justification.

The idea persists that if users are required to pay the actual cost of systems design, programming and operations for a new application, systems development would be inhibited. Faced with these costs, this reasoning maintains, users would find other means of obtaining new systems, and an important new systems opportunity would be lost. This line of reasoning is used to avoid chargeback schemes and other actions that would put users in a position to evaluate the true worth of a system.

But a confident MIS executive will not be drawn into systems projects that do not have strong user support, both financial and operational. Only users can truly assess and commit to the economic and operational benefits of computer-based information systems.

The proper role of MIS executives is to act as an idea catalyst and to coordinate development of a comprehensive plan for designing and implementing the system to which users have strongly committed themselves.

This in no way minimizes the importance of MIS executives. In fact, it will enhance and elevate their positions because they become advocates of the possible rather than the impossible. I say impossible because systems without financial, operational and implementation support from users cannot, and will not, succeed. MIS executives must do everything possible to avoid falling victim to this myth. They must see that every major systems project is supported by a comprehensive user-driven cost/benefit analysis.

They must also insist that the users who benefit, whether they be in marketing, engineering, manufacturing or administration, provide funding for both development and operations. The approach is analogous to buying an insurance policy against systems project disasters.

Myth #2. Distributed processing using minicomputers is inherently economically superior to remote processing using mainframe systems.

This myth is so deeply embedded in our

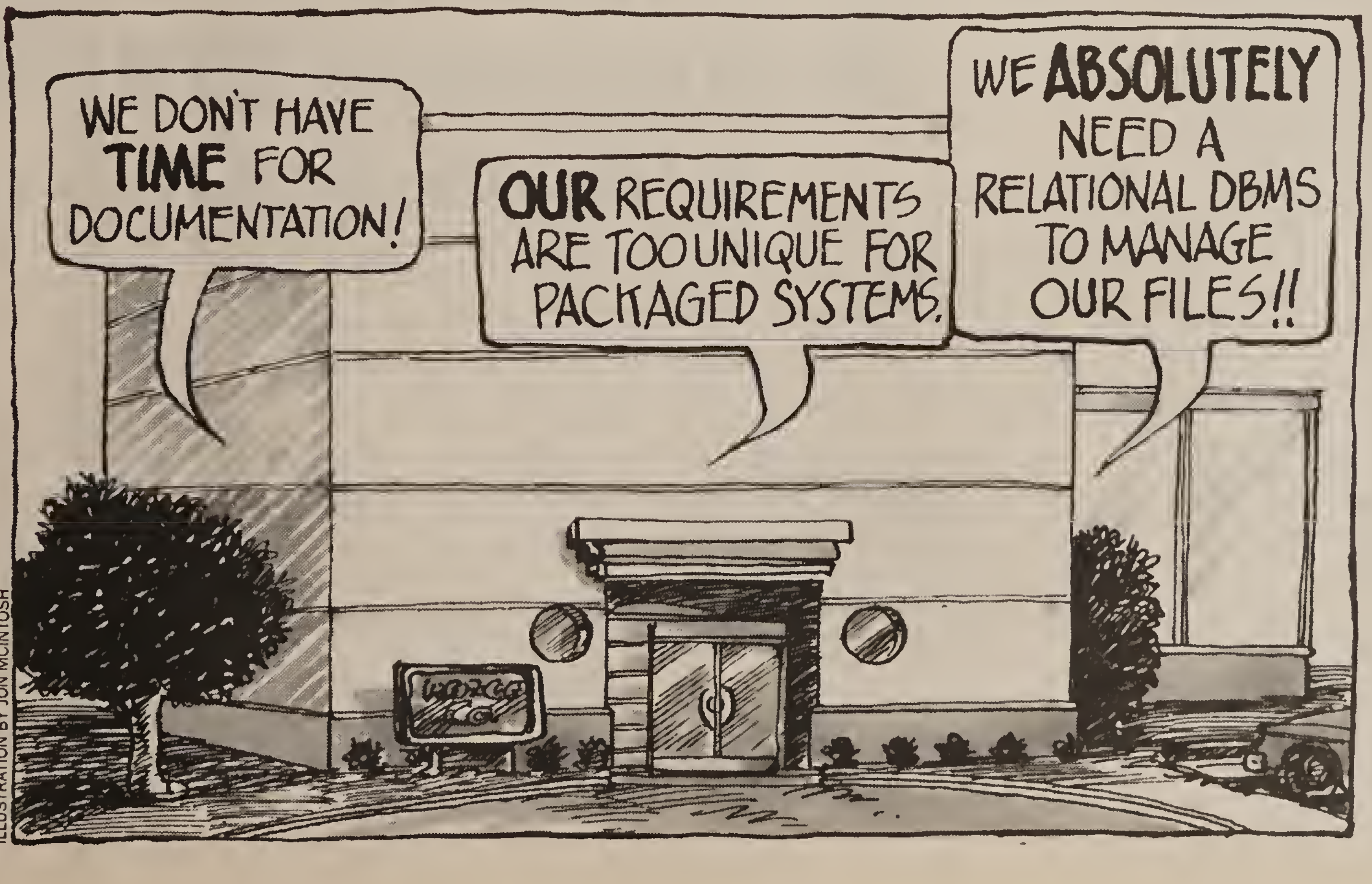

WE DON'T HAVE TIME FOR DOCUMENTATION!
OUR REQUIREMENTS ARE TOO UNIQUE FOR PACKAGED SYSTEMS.
WE ABSOLUTELY NEED A RELATIONAL DBMS TO MANAGE OUR FILES!!

ILLUSTRATION BY JON MCINTOSH

About the author

Riggs is president of J. Robert Riggs Co., a Dallas firm specializing in strategic systems planning, MIS cost evaluation and networking. Previously, he was staff vice-president, information systems planning, for Dresser Industries, Inc.

psyches that to challenge it publicly could be considered heretical. It is difficult to attribute this persistent myth to anything but industry hype, yet there is more to it than that.

Interestingly, the advocates of distributed processing seldom, if ever, provide a cost/benefit analysis in support of their point of view. Carefully disguised advertisements in *Fortune* magazine and other prestigious publications aggrandize distributed processing with no supporting rationale. Non-MIS department heads and users' groups help perpetuate this myth.

During a period of 17 years, I participated in several studies on the economic feasibility of distributed processing vs. the use of a well-managed mainframe host system. We never found a situation in which users could save money with a distributed system — the economics were always in favor of the host system.

The reasons are obvious. Costs for the duplicate software, hardware and technical support staff involved in multiple-site distributed systems are simply not economically competitive. A host system serving 100 users holds so much economic leverage on software, hardware and technical support staff costs that distributed systems cannot compete on a cost basis. There are reasons — some good ones — for implementing distributed processing, but none of them are based on economics.

Myth #3. The reliability of telephone lines is a significant problem in remote on-line computing.

It is true that the communications network as a whole can be a problem, but the problems are not primarily in the leased telephone lines. A leased phone line will break about every 120 days, or once every four months, and the mean time to repair it is 1½ hours. Assuming a five-day workweek, eight hours a day, of on-line operations and further assuming all outages occur during on-line operations, the telephone line availability is 99.6%. Still this myth persists.

At Dresser Industries, Inc., during several years of operating a voice/data network with more than 700 point-to-point lines, we maintained meticulous and detailed records of communications outages. Every outage — communications, software, controllers, multiplexers, human error and so on — was logged into a computer data base for analysis. Year after year, our operation achieved 99.6% or better availability of the point-to-point telephone lines.

No substitute exists for carefully logging every outage from the CPU to the CRT. I advocate a 10-level incident recording system, accounting for outages as follows:

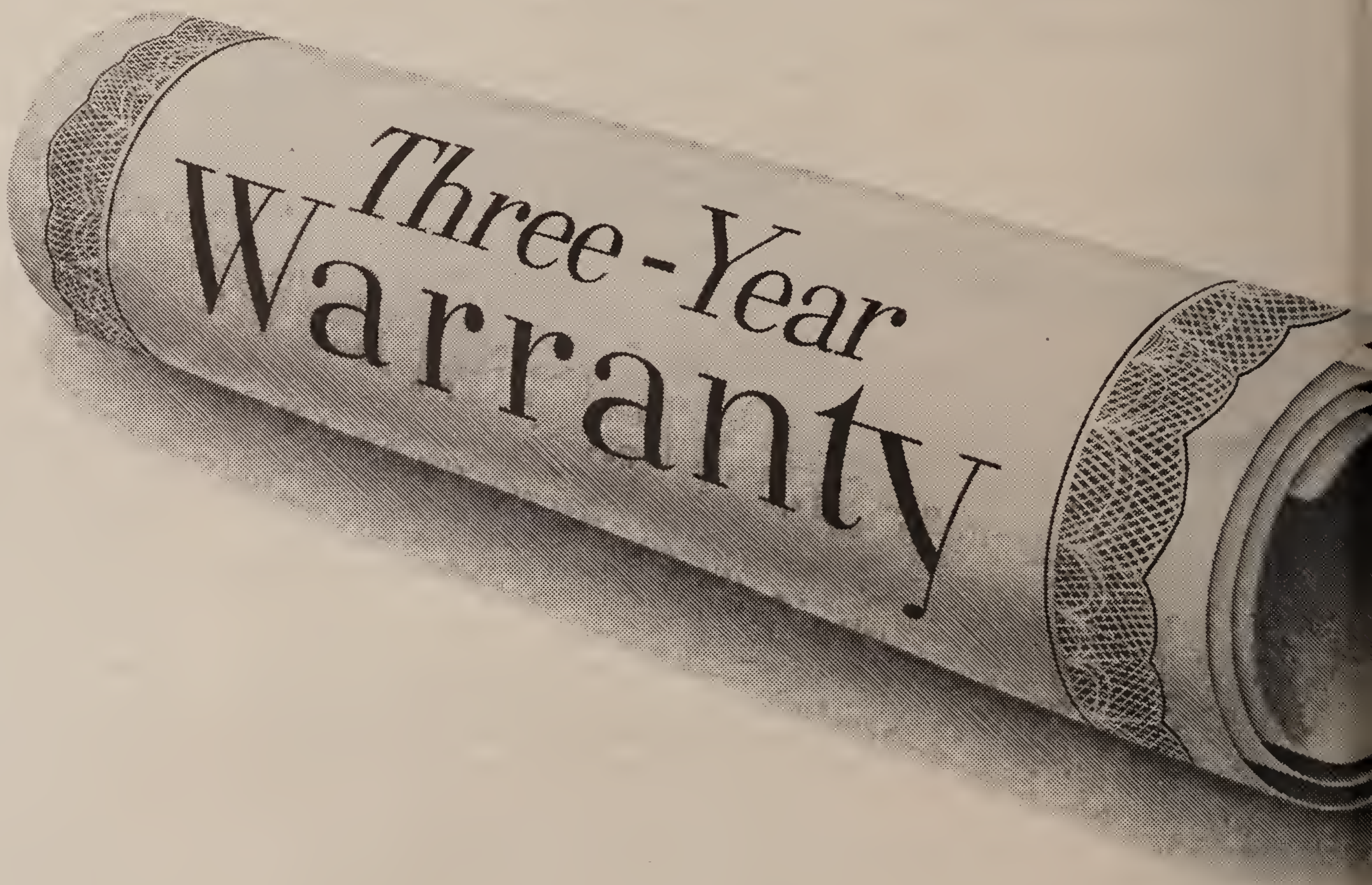
1. Modem at user site.
2. Circuit to user site.
3. Modem at remote site.
4. Communications controller at remote site.
5. Trunk line modem (remote).
6. Circuits (phone lines) to remote controllers.
7. Central site modem.
8. Communications controller at central site.
9. Subsystem (IBM's CICS, TSO, batch and so on).
10. CPU.

We developed a communications quality control system in which every incident was recorded under this 10-level code and then exploded, like a bill of materials, to provide the total impact on user availability to the CRT.

With minimal manual effort, we could report availability of each and every CRT on the system — 4,000

”

> ***Only users can truly assess and commit to the economic and operational benefits of computer-based information systems. The proper role of MIS executives is to act as an idea catalyst and to coordinate development of a plan for designing and implementing the system to which users have strongly committed themselves.***



One of the most significant developments in IBM ASCII terminals is the one you may never use.

of them — and provide a comprehensive explanation. Users could access availability reports via their CRTs or call customer service. This comprehensive communications control and reporting system convinced both corporate and operating units that telephone lines were not the major cause of outages at the CRT.

Myth #4. Turnaround time is a universal and accepted method of measuring performance of a computer system.

Actually, turnaround time is only one of many criteria to be used in evaluating the performance of a computer system. Other important factors include the amount of work to be done and facility requirements such as tape vs. disk storage.

The use of turnaround time as a measure of batch system performance is at the very best confusing; at worst, it is seriously misleading. Whereas some edit runs take a few seconds, engineering calculations often take several hours, even on the most powerful computer. Obviously, turnaround time is not a good measure of a batch system's performance, whether on a mainframe or distributed system.

A more effective and consistent measure of batch performance is in-queue time. In-queue time is defined as the interval between the time the last job instruction is read and when the CPU's execution begins. Measuring batch system performance in this manner treats every job in the same way, regardless of how long it runs. It also helps users better understand performance, because they know whether the job is short or long — a characteristic of the job that is their responsibility.

However, users cannot control in-queue time and are justifiably upset when the job resides in the queue for an extended period of time. Developing a system for recording and reporting batch in-queue time is a critical responsibility of the MIS executive. Without such a system, there is little hope of understanding and improving batch system performance.

Myth #5. Locally installed computers will enhance and improve systems design over systems planned for remote processing.

This is a very popular myth, one that is actively promoted and encouraged by the distributed DP zealots. I have seen no evidence to support this myth, and, in fact, the opposite may be true. In any event, good systems design is accomplished by quality-conscious designers. Their work is totally independent of the physical proximity of the computer system.

Myth #6. A large-scale computer facility that is totally unscheduled is innately bad. Conventional wisdom suggests that a sophisticated computer-based batch scheduling system is required to achieve high performance.

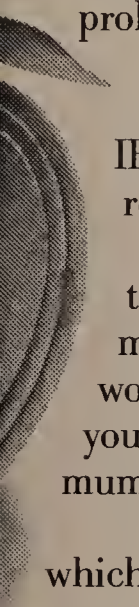
The advocates of computer batch scheduling of a large center overlook the single most powerful tool a computer center manager has to control the flow of jobs to avoid peak loads — cost control. Given the proper cost incentives, users will provide the best possible scheduling.

Shift-differential pricing provides the cost incentives needed to motivate users to level out their work. Every user has a wide range of response time needs for on-line and batch systems. On-line systems typically require three to four seconds of consistent response time. While much is said and written about the advantages of subsecond response time, there are very few applications in which three to four seconds is unacceptable.

Likewise, batch systems consist of high-, medium- and low-priority jobs. The following formula has been extremely effective in achieving level loading of batch work, with five minutes of in-queue time maintained on all shifts:

- From 8 a.m. to 8 p.m., users would pay 100% of the transaction unit price during the week and 10% of this price on the weekend.
- From 8 p.m. to 8 a.m., users pay 40% of the weekday transaction unit price during the week and 10% of the unit price on the weekends.

Since on-line systems usually process most transactions from 8 a.m. to 5 p.m., users pay a premium for continuous immediate response. The 60% discount for night and 90% discount for weekend processing result in



Announcing an IBM first: the three-year ASCII terminal warranty.

Here's how it works. Should you have a problem with any of the three elements* of an IBM ASCII terminal purchased after June 15, 1986, just take the problem element to any IBM Service Exchange Center or IBM authorized remarketer.

They'll exchange the non-working element for one that works. So you'll be on your way with a minimum of downtime.

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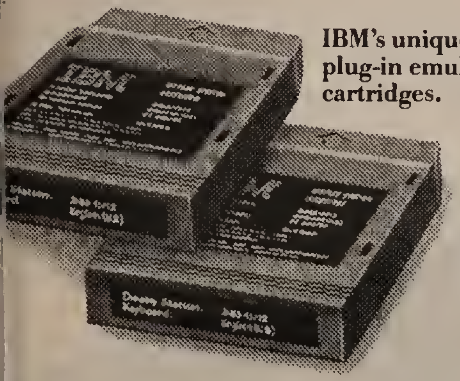

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Hazeltine 1500	X	X		
Lear Siegler ADM-3A	X	X		
Lear Siegler ADM-5	X	X		
TeleVideo 910, 910+, 912, 920, 925, 925E	X	X		
TeleVideo 950			X	
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Enhanced IBM 3708 Attachment	X			

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Myth #7. Data base management systems are inherently good; therefore, everyone should have one.

There is growing evidence that DBMS are not the panacea that they are sometimes touted to be. Such systems can be costly in systems resource utilization.

In many cases, straight file access methods are easier to use and efficient to run. This is not to say that data base systems do not have their place. However, MIS managers should not be embarrassed to admit they are not using the latest and greatest data base systems, as the pros and cons are many and diverse.

Myth #8. It is impractical, if not impossible, to effectively separate systems design from programming.

This long-standing myth is single-handedly responsible for much of the grief associated with late, over-budget projects. MIS people in general are reputed to be always behind schedule, over budget and capable of inflicting harm when implementating a new system. If the underlying causes of these consistent failings were to be examined, one explanation would be a failure to separate design activity from programming.

MIS professionals seem to have an irresistible urge to begin coding before the systems design is complete. The result is often chaos, confusion and much reworked code. It is a very destructive process.

The failure to separate systems design from programming may relate to another myth: that programming is a management or professional activity. In general, it is not. There may be special situations that elevate programming to a managerial-level function, but the vast majority of it is blue-collar work. Coding from design specifications is rote clerical work.

While systems design should involve the users in continuous interaction with the analyst, the programmer has no need to interact with users. When these issues are confused, the project suffers.

Myth #9. A new system is complete and ready for production when all programs have compiled successfully.

This myth is so pervasive that it continually threatens the effective management of most new systems development projects. The urge to consider a system complete when all the programs compile and pass individual unit testing is almost irresistible. Of course, this line of thinking is at the root of many failed systems projects. The computer industry has failed to develop quality control procedures to ensure that systems work properly before subjecting the user community to the systems' implementation.

The question must be asked: Why does this myth persist? Is it because designers and developers are rewarded at the point of unit test? Is it because of time pressure?

In my judgment, the origins of this myth go back to the basic outlook and behavior characteristics of MIS people: executives, supervisors, analysts and programmers. These professionals are optimistic, committed people who believe in themselves and their projects. Unfortunately, these desirable qualities too often are not coupled with the implementation of hard-nosed, tough-minded quality control procedures within the project itself, so the MIS professionals plunge on, buoyed by their own commitment and that of those around them.

> ”
>
> *Good systems design is accomplished by quality-conscious designers. Their work is totally independent of the physical proximity of the computer system.*

A maturing, toughening process is at work among these idealistic professionals, but the journey to a fully realistic view of their work is a slow and painful one. The information systems business, as we know it today, is only about 30 years old. These things take time.

Myth #10. Systems documentation is an important part of the systems process, but there simply is not time to complete documentation and meet schedules.

This myth represents one of the most damaging practices followed by MIS executives. These managers do not have time to do a proper job of documentation, but they do have time to spend countless hours researching the cause of a system malfunction. This practice is a major cause of the lack of credibility that executive management associates with the MIS function.

The documentation problem has been exhaustively covered in trade journals, seminars and conferences, yet MIS executives repeat the error over and over again. I have spoken with a number of executives in my search for an explanation; no one has an answer. Each one takes an oath never to do it again — and then falls victim with the next major systems project. The emergence of fourth- and fifth-generation languages, which are largely self-documenting, will mitigate the problem, but the problem itself will not be resolved until MIS makes and holds

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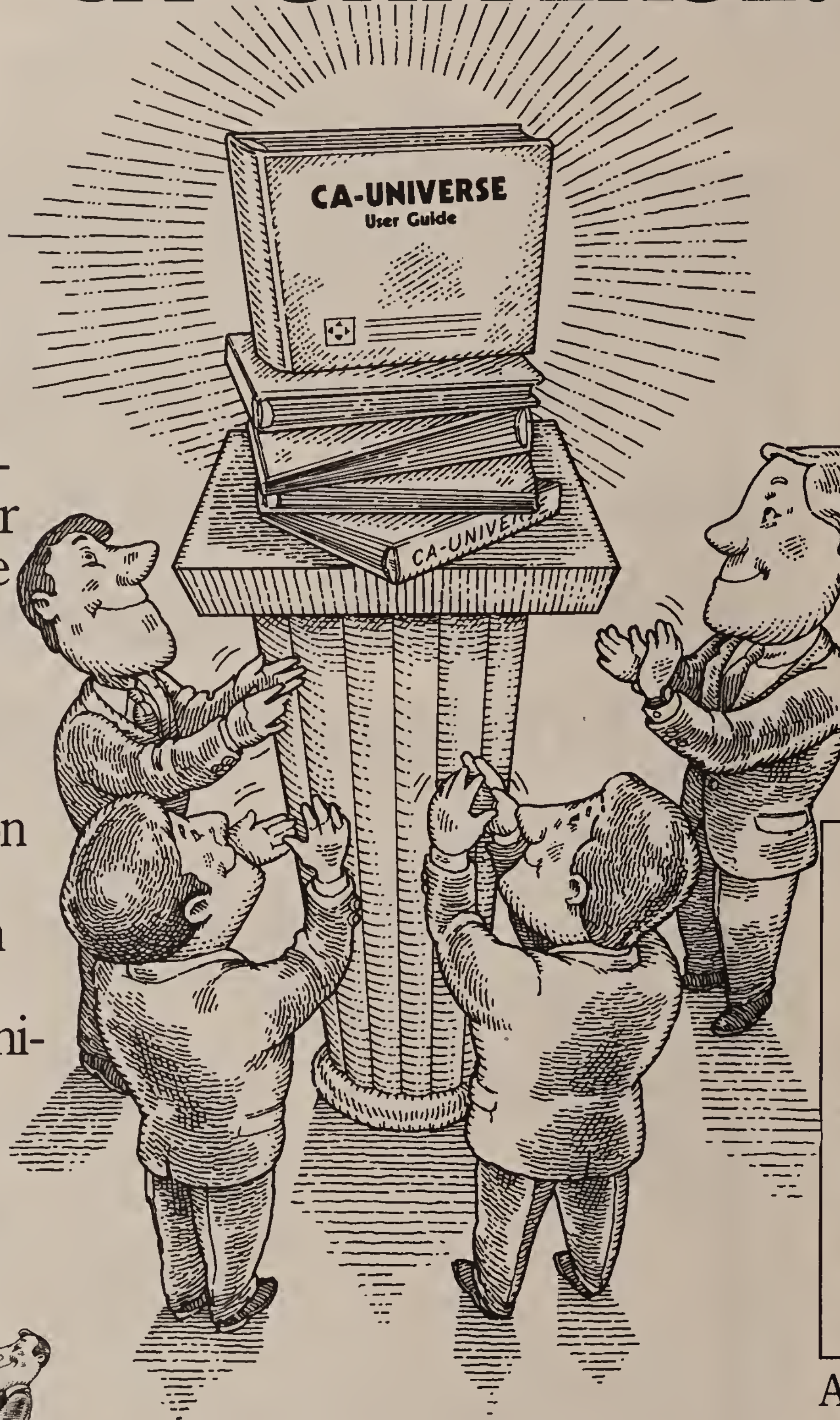

Some say that the major factor influencing your DBMS decision should be adherence to a true implementation of the relational model. Others advocate application development and production database capabilities. Some promote migration capabilities and others promote a 3-schema architecture and referential integrity.

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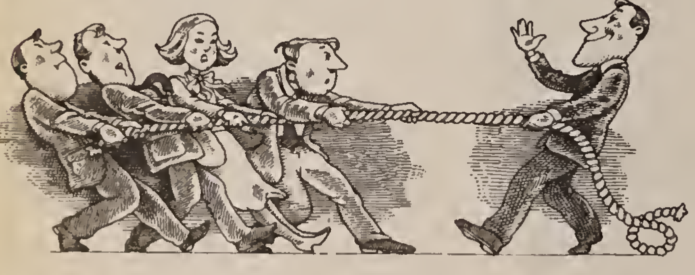

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to the commitment.

Myth #11. Packaged systems are very good for the systems needs of other companies, but our requirements are so unique that we must build our own from scratch.

This myth is the cause of tremendous waste in the development and maintenance of information systems. Currently, few truly unique information systems exist within broad industry groups. The banking, manufacturing, retailing and insurance industries have unique systems requirements, but individual companies within each subgroup have very little real need for start-from-scratch information systems development.

For each industry, well-designed, well-documented and well-maintained systems exist for virtually every function of the enterprise. The successful MIS executive will seek out the best of these systems, initially installing them with minimal change and gradually adapting them to the real needs of their users. The flexibility and adaptability of these packaged systems make them work well for a lot of companies. Most are easy to customize to fit the specific needs of the business.

Myth #12. Modifying the existing system to meet new requirements will be more expensive than starting from scratch and designing a replacement.

This view, widely held among MIS professionals, is very rarely true. These professionals seem to feel an irrational urge to start over whenever possible in spite of their experiences with the high cost and difficulty associated with starting systems development from scratch. In rare instances, such as an old IBM 1401 system running in emulation, starting from scratch or purchasing a package may be justified. But with these extreme exceptions, it is much better to modify an existing system to meet new user needs.

□

The 12 myths discussed here are not the only myths that persist in MIS. Most people involved in MIS could add their own myths to the list. But these 12 are among the more important, and it is hoped that by displaying them publicly, a dialogue will begin that will, in turn, lead to improved performance and a gradual diminution of the deleterious effects on our profession. ■

> ”
>
> ***MIS professionals seem to feel an irrational urge to start over whenever possible in spite of their experiences with the high cost and difficulty associated with starting systems development from scratch.***

CORRECTION

The headline of the Sept. 22 story by Stephen Gerrard incorrectly identified the acronym SQL. It stands for Structured Query Language.

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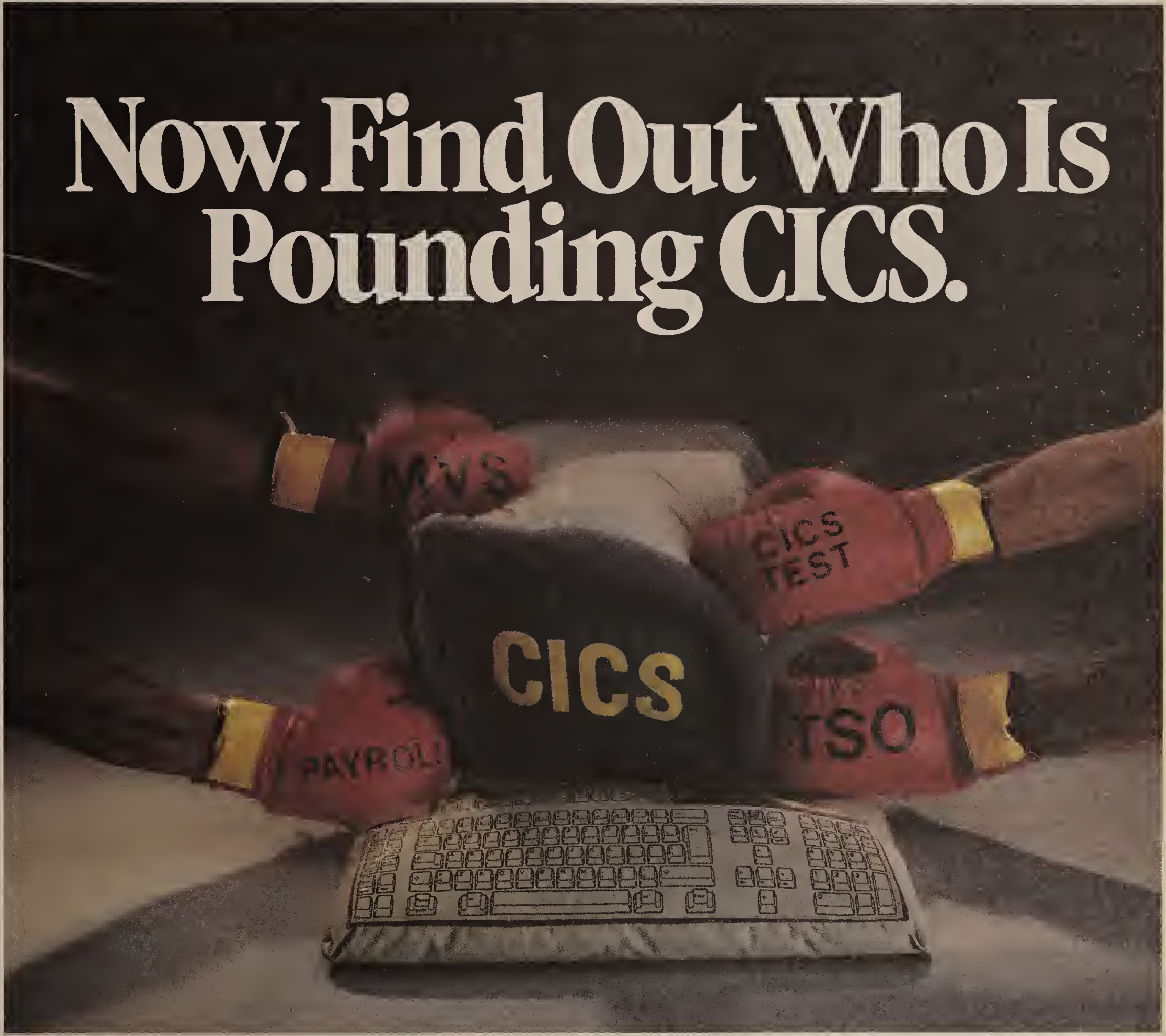

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Windowing software shatters users' hopes

Reduced performance curbs usefulness on current PCs • Sparse applications are balanced by available tool kits • Power users run multitasking jobs on souped-up PC ATs

By TRACY LICKLIDER

Is multitasking/windowing software for you? All the ballyhoo from vendors of these IBM Personal Computer-geared products would like you to believe it is. But many users are saying no, after their expectations of quick and easy access to multiple applications were dashed by sluggish performance and ill-fitting applications.

A thread of messages that appeared on the Boston Computer Society's IBM special interest group electronic bulletin board system after demonstrations before the group by Microsoft Corp. and Quarterdeck Office Systems reflects some users' views of today's situation:

"The shortcomings of Windows shone brightly next to the clear practicality demonstrated by [Quarterdeck] Desqview."

"At the technical subgroup, someone suggested getting a speaker to talk about [Microsoft] Windows. *No one* was interested. Not one peep. Most of the people present were heavy technical types who do development for a living. I was astonished at the lack of interest."

"I have had Desqview sitting on my desk at work for about a month. One of these days, I'll install it. . . . I was impressed by the scope of Windows, but on an IBM Personal Computer AT or similar and DOS 3.1, the thing is frankly a pig. Right now, it seems like an elaborate toy."

"It took me a number of weeks to get used to Windows, and the program is very slow on a PC, but now I use it constantly. . . . I found a public domain disk caching program essential to speeding up operations."

This article defines what multitasking/windowing software does, tells you who the players are and where they stand. It examines what users like about such packages, why a number of users steer clear of them and some features of the alternatives currently offered.

What does multitasking/windowing software do? The various packages available today each do some or all of the following:

- Run multiple applications simultaneously.
- Allow you to quickly switch from one program to another.
- Let you copy data from one application into another.
- Manage the screen so that you can see pieces of the display of two or more "well-behaved," or multitasking/windowing conforming, programs on the screen at once.
- Provide screen, printer and other device independence so that you can easily change the devices, such as keyboards, mouses and printers, with which a program connects.
- Offer an easier way of issuing DOS commands.
- Make available to programmers a tool kit of standard program pieces that make developing applications simpler and quicker.

Virtually all multitasking/windowing software packages operate by interposing themselves as an additional software layer between the disk operating system and applications programs. Digital Research, Inc.'s Concurrent DOS is an exception; it operates as a complete substitute for the usual IBM PC-DOS.

CW PHOTO BY O'CONNELL/LADOUCEUR

Unfortunately, today's multitasking/windowing implementations exact a steep price in reduced performance, which limits their usefulness on current personal computer hardware. Moreover, virtually none of the top-selling applications software packages have been rewritten to take advantage of the new features that the multitasking/windowing packages offer without making some adjustments.

Likely candidates

Users of current multitasking/windowing software fall into four categories.

Software developers. The first kind of users are software developers writing software of all kinds for the IBM PC. These developers use the graphics capabilities in Microsoft's Windows and Digital Research's Graphics Environment Manager (GEM) for displaying fonts and achieving compatibility with a variety of printers

About the author

Licklider is chairman of Ontio Computer Products Corp. in Cambridge, Mass. Previously, he was chief operating officer at Software Arts, Inc.

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> *Virtually none of the top applications have been rewritten to take advantage of the new features that the multitasking/windowing packages offer without making some adjustments.*

and typesetting devices. They also see the advantages to running communications software in the background while using other applications in the foreground.

Boston Software Publishers, Inc., for one, has announced that it plans to rely on Windows' graphics in porting its Apple Computer, Inc. Macintosh-based Macpublisher desktop publishing software to its PC Publisher version for the IBM PC. Using the graphics tool kit that Microsoft Windows provides will allow developers to bypass the time-consuming and tedious implementation of all the graphics and printer interfaces that their products would require.

Bob Doyle of Boston Software Publishers says his company believes Windows will lead to critically needed industry standards for desktop publishing — standards for printer drivers, for interfaces to page formatting devices and for font handling — without which chaos will ensue.

Corporate shops. The second group of users includes corporate DP and MIS shops that are using multitasking/windowing products as tools for building in-house PC-based applications. Merrill Lynch, Pierce, Fenner and Smith, Inc., which built its internal municipal trading system around Windows, characterized its use of Windows as a tool kit approach.

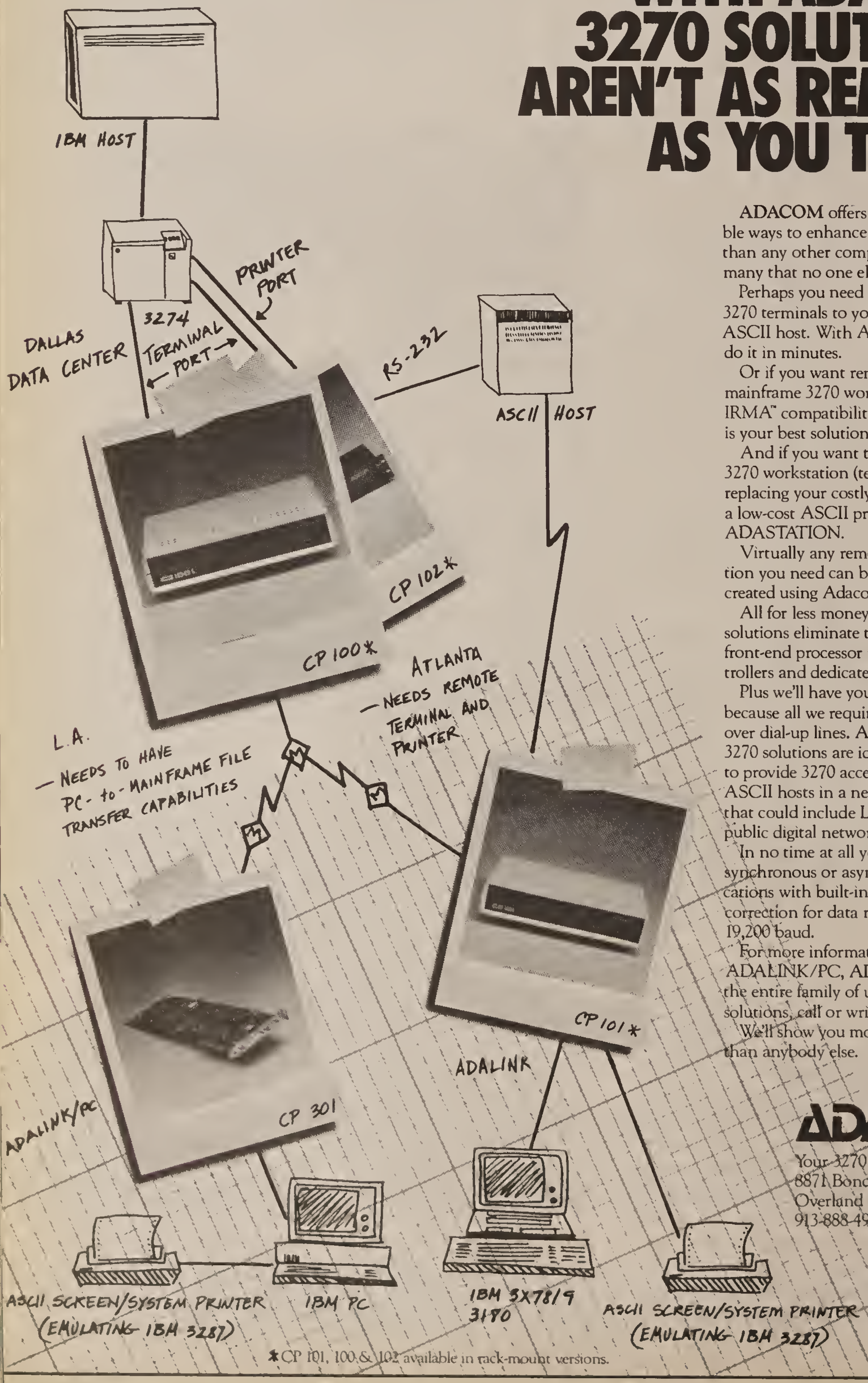
Some of the DP/MIS shops unable to meet corporate demands for customized PC software systems will take advantage of the preprogrammed building blocks (for user interfaces, moving data from one application to another and so on) that come with developer kits for these multitasking/windowing packages. By purchasing such a package and an accompanying tool kit, some of these shops will effectively be able to buy development time.

Indirect users. The third group consists of users who choose multitasking/windowing packages indirectly because they use a product specifically adapted for one of the multitasking/windowing products. These users are few because very few nonvertical applications programs have been adapted to take advantage of the special capabilities offered by the multitasking/windowing systems.

Microsoft, for example, cited only four companies that had specifically written software to use Windows' features: Micrografx, Inc., Palantir Software, Merrill Lynch and Reuters Holdings, PLC. Microsoft itself has only recently announced its intentions to release business applications software to run under Windows. Of the others, the Palantir filer program and speller are the only packages that may demonstrate a broad commercial appeal.

Direct users. The fourth and most interesting group among the current users are the people who really are using the products to run multiple standard applications. Farokh Irani of Telmar Group, Inc., a software vendor in New York, is one. He and his colleagues at work run Softlogic Solutions, Inc.'s Doubledos on souped-up PCs — all with at least the full 640K bytes of random-access memory (RAM) and most with enhanced graphics adapter (EGA) cards.

Irani uses Doubledos as a programming environment for editing and compiling programs. He started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In Depth/Multitasking and Windowing

with Doubledos 1½ years ago. He considered IBM's Topview but found it to be a "huge dog" and a "major pain." He also looked at Microsoft Windows when it came out. He said it used too much RAM and included more features than he needs. He said one had to do too much programming to write applications for Windows.

Irani originally sought multitasking capability because he wanted to use his computer while it was running bulletin board software. He attributes the ability to handle the communications task and his own work to Doubledos's clever implementation, in which it splits the PC's processing capacity among the tasks.

A quick who's who

Topview is IBM's entry in the multitasking/windowing category. As the IBM manual puts it, Topview is "an extension to the IBM Disk Operating System that allows you to run several programs at the same time and view screens from more than one program on your display."

Microsoft terms its entry, Windows, an operating environment. In its welcome in the Windows documentation, Microsoft echoes IBM in saying, "Windows is an extension of the DOS operating system." According to Microsoft literature, Windows lets users work with several programs at the same time, switch between applications, run more applications than will fit in memory, transfer data from applications into Windows desktop applications and access an easy-to-use command interface.

IBM and Microsoft make up the main two camps. A key difference between them is that IBM's Topview runs on PCs with monochrome display adapters as well as on systems equipped with either regular or enhanced color cards. Microsoft has abandoned green-and-black screens: With Windows, you have to have some kind of graphics-capable display adapter. To get monochrome, you have to have a Hercules Computer Technology, Inc. graphics card or compatible. With Microsoft Windows on an old-style color graphics adapter (CGA) color card, you get black and white. If you want real color, you have to have an EGA card.

Conversely, IBM's character-only — as opposed to pixel-addressable — windows are coarse looking compared with Windows' windows. Nevertheless, IBM commits to having its multitasking/windowing software run across the spectrum of PCs, and Microsoft's abandonment of monochrome display systems can pose problems for companies that have PCs with a variety of display capabilities. If the companies move their applications to Windows, they disenfranchise some of their workers or would-be workstations.

Perhaps as prices for color monitors drop toward monochrome prices, this will become somewhat less of a problem, but in the near term, it is something for at least the price conscious to weigh.

In the IBM camp

Quarterdeck lines up squarely in the IBM camp with its Desqview program, which it dubbed "the multiwindow integrator" that "enhances your PC's DOS." Desqview offers windows, virtual memory, concurrency, interapplication data transfer and other features.

Like the other multitasking/windowing systems, Desqview runs standard, written-for-PC-DOS applications. In addition, Desqview runs programs written or rewritten to take advantage of special Topview-specific system calls. Programs tailored for Topview will run under Desqview, too — well, most of them.

Desqview supports most but not quite all of Topview's system calls; Quarterdeck says it plans to have a 100% Topview-compatible version out in late 1986. Like Topview, the Desqview runs on all displays; Quarterdeck, too, believes you have to cover the full range.

Desqview requires less memory than either Topview or Windows and includes some unique and useful capabilities that may well make it today's most pragmatic choice among multitasking/windowing contenders.

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> ”
>
> *IBM commits to having its multitasking/windowing software run across the spectrum of PCs, and Microsoft's abandonment of monochrome display systems can pose problems for companies that have PCs with a variety of display capabilities.*

Desqview is its simple installation. When Desqview is installed on a hard disk, it scans the whole disk looking for applications that the system maintains on a preprogrammed list. The package then automatically installs these in its applications start-up menu so that users can start running their usual applications from Desqview literally within minutes.

Desqview also includes special loader programs for the top-selling application programs. Without these special loaders, the program could be run under a windowing system but would always take up the full screen — which defeats some of the gain of having a windowing system. These special program loaders adapt the programs to run within windows.

One-task windowing

Bivouacked a good distance from the two main camps, Digital Research offers two multitasking/windowing products: GEM Desktop and Concurrent DOS. GEM is quite similar in function and appearance to the Apple Macintosh user interface — so similar, in fact, that Apple threatened to sue Digital Research if it did not redesign GEM to be less similar. Digital Research later complied.

Redesign notwithstanding, GEM provides a simplified mechanism for issuing DOS commands by working with menus and by pointing at icons. However, GEM only runs one program at a time. It does perform some windowing functions, such as display access to directories, though, and allows users to copy data from system to system. Additionally, GEM maintains some graphics standards and possesses device change qualities. It requires a graphics card and will not run on monochrome systems, a factor that puts it idealogically into the Windows camp.

For running more than one program at a time, Digital Research also offers its Concurrent DOS, which, unlike all the other products just listed, is a replacement for standard DOS rather than an extension of it. While Concurrent DOS lets users run multiple programs, it has none of GEM's icons and menus; it does, however, have its own menu-making kit and lets users build customized menus to create simplified, turnkey-like operation of PC-DOS applications. Concurrent DOS emulates most but not all of PC-DOS; hence, most — but not all — applications run.

One of the simplest and least memory-hungry programs in the multitasking/windowing category is Softlogic Solutions' Doubledos. According to the documentation, "Doubledos is designed to run applications that are written for PC-DOS or MS-DOS. With Doubledos, you can run two of these programs simultaneously." That's it — just two. Even though Doubledos has no split-screen windows, no data transfer and no device independence, its compactness makes it a seriously useful program for today's hardware.

Finally, there is even a public domain/shareware multitasking/windowing product: Dosamatic from Marin Pacific Software. While it does not offer windowing, Dosamatic is a low-priced, useful shareware product, offering such features as switching between programs as well as a number of features that make issuing DOS commands easier.

Microsoft beats the drum

Microsoft has lately pummeled the industry with announcements about its Windows product. In June,

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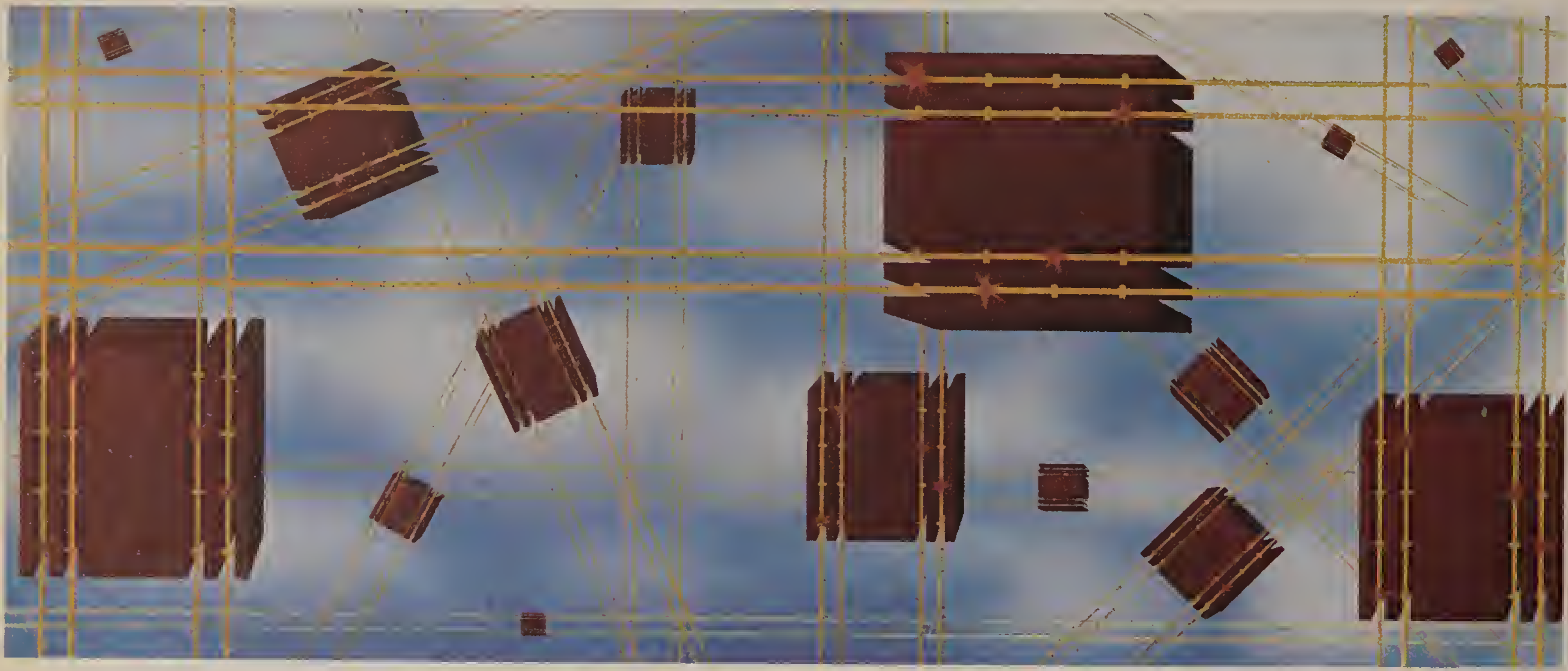

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Multitasking/windowing software bites into memory

The memory required by multitasking/windowing programs leaves little room for multiple applications to run.

Vendor	Product	Takes Up (bytes)	Leaves for Applications* (bytes)
Microsoft Corp.	***Windows 1.01***	163K	304K
IBM	***Topview 1.0***	146K	321K
Digital Research, Inc.	***GEM 1.1***	133K	334K
Quarterdeck Office Systems	***Desqview 1.2***	130K	337K
Norton Computing, Inc.	***Commander 1.0***	103K	364K
Lotus Development Corp.	***Spotlight 1.1***	88K	379K
(public domain)	***Still River Shell***	83K	384K
Marin Pacific Software (public domain)	***Dosamatic 2.06***	79K	388K
Borland International, Inc.	***Sidekick 1.5***	63K	403K
Softlogic Solutions	***Doubledos 3.2d***	47K	420K

* The chart assumes 512K bytes of random-access memory, default buffers, no SYS files and DOS 3.2, which takes up 45K bytes memory.

Microsoft put on a Windows-on-Wall-Street gala presentation of big-name financial companies' in-house software applications based on Windows. It also ran an East Coast developers' conference to tout the virtues of a Windows-based future to software developers and major companies' MIS departments.

The company has previewed what it terms rich-text format and dynamic data exchange additions to Windows. The former is an add-on that allows programs to exchange not only character text information but also font and style data. Similarly, dynamic data exchange allows applications to share data in such a way that a change in the value of one side of the window changes that value in the other side.

Unfortunately, while trying to build momentum for Windows, Microsoft's Chairman Bill Gates largely conceded that Windows has not won the hearts and minds of users because it runs too slowly on the IBM PC and Personal Computer XT. To underscore that concession, Microsoft subsequently introduced its Mach 10 speed-up board. For $550, the Mach 10 replaces the PC's Intel Corp. 8088 processor with a zippier 8086 processor and some 16-bit cache memory.

Taken together, Gates' statement and the announcement of the Mach 10 board seem to amount to an official pronouncement from Microsoft that if you have a plain old PC or PC XT and do not beef it up with a processor replacement board Windows is not for you.

Microsoft also made news by acquiring Dynamical System Research, Inc., a company that developed and sells a Topview clone named Mondrian. If Windows is the future, why should Microsoft be interested in acquiring Topview technology — unless the company is hedging its bets?

IBM stance unclear

Meanwhile, IBM hesitates to take a solid stand on its own Topview undertaking. As part of an omnibus unveiling of products earlier this year, IBM included Topview 1.1, a minimal upgrade of the original. The upgrade takes advantage of PC-DOS 3.0 support, more or less bringing Topview up to modern times.

But IBM has done little else to give Topview a push into the multitasking arena. Rumors concerning potential graphics capabilities for the environment flow through the industry but fail to materialize. While a tool kit is available for Topview, IBM has done little to promote it and not much more to promote the environment itself.

For potential buyers, this jockeying for position by vendors spells uncertainty in terms of system compatibility and available applications software. But there are other barriers to acceptance of multitasking/windowing as well.

Memory barriers

First among them is memory. Today's PC, PC XT, and even PC AT hardware is basically insufficient to run multitasking/windowing software well. The standard PC and the

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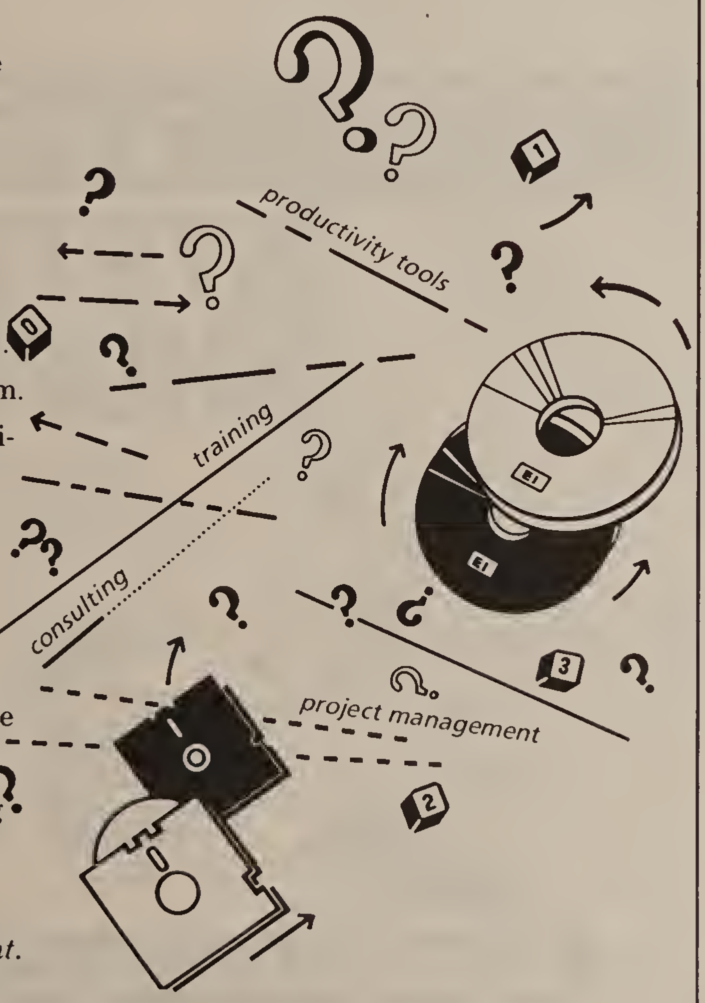

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Memory requirements of applications running under Microsoft Windows

A multitasking/windowing program, such as Windows, keeps a list of the memory requirements for all applications it can run, such as the ones below, in a Program Information File. The list, maintained by the package's vendor or a subsequent tool developer, records the minimal required memory a particular application needs to function at all as well as the desired memory needed for the application to function smoothly.

Vendor	Application	Memory in Bytes Requires	Memory in Bytes Desires
Software Publishing Corp.	***Harvard Project Manager***	440K	640K
Microsoft	***Windows Write***	320K	*
Ashton-Tate	***Framework***	312K	640K
Lotus Development Corp.	***Symphony***	290K	640K
Microsoft	***Access***	256K	320K
Micrografx, Inc.	***PC Draw***	256K	256K
Microrim, Inc.	***R:Base***	225K	320K
Micropro International Corp.	***Wordstar 2000***	225K	320K
Microsoft	***Microsoft Word***	192K	320K
IBM	***Writing Assistant***	196K	256K
Lotus	***1-2-3 Version 2***	170K	320K
Ashton-Tate	***Dbase III***	128K	256K
Software Publishing	***PFS/IBM:File***	128K	256K
Microsoft	***Multiplan***	128K	256K
Computer Associates International, Inc.	***Supercalc 3***	128K	256K
Lifetree Software, Inc.	***Volkswriter Deluxe***	128K	256K
Wordperfect Corp.	***Wordperfect***	128K	256K
Microstuf, Inc.	***Crosstalk***	64K	128K

* No figure given

PC XT effectively address a maximum of 640K bytes of memory, which simply is not enough memory to hold DOS, a multitasking/windowing extension to DOS and more than one application program with associated data. IBM's PC-DOS Version 3.2 takes up about 45K bytes of memory all by itself, not counting additional file buffers or any SYS files that may need to be installed.

Memory can be expanded above 640K bytes by using special memory boards that implement memory-bank switching. However, this adds significantly to the cost of the hardware necessary for multitasking/windowing applications, and memory switching slows down already slow processing under multitasking/windowing. The PC AT hardware can address a hefty 16M bytes of RAM; unfortunately, this potential cannot be reached running under PC-DOS, which imposes the same 640K byte memory ceiling on the AT that it does on the lesser PC and PC XT.

The chart (page 95) shows the bite that the various multitasking/windowing contenders (and some alternative, non-multitasking/windowing programs discussed later) take out of available RAM.

Users have to fit the multiple applications and their data into the memory left over. In assessing the usability of current multitasking/windowing offerings on current PC hardware, it is instructive to look at the memory required to run top-selling applications.

Required vs. desired

Herein lies a rub not necessarily covered by truth-in-advertising laws. There is no exact definition of required memory. In theory, the required memory could be the absolute, barest minimum memory needed to run at all (see chart at left).

On a machine with 512K bytes of RAM, Microsoft Windows stipulates for Lotus Development Corp.'s 1-2-3 Version 2 a required memory of 170K bytes. After loading MS-DOS and Windows, this leaves only 31K for the work sheet — enough to hold, for example, a 30-row by 30-column sheet of minimalist formulas.

A little arithmetic will show what combinations might fit; few do in a conventional 512K-byte PC. In fairness to Microsoft, it should be noted that, on the side of the package under Windows' 256K-byte memory requirement statement, Microsoft does recommend additional memory when using multiple applications. I call this recommended, extra amount of memory the desired amount.

Likewise, in fairness to IBM, after it proclaims that Topview requires a minimum of 256K bytes of memory, it warns users that more memory may be necessary to run several programs at once. At least Quarterdeck has the courage to require 512K bytes and to recommend 640K bytes. As for desired memory, Ashton-Tate's Framework, Lotus's Symphony and Software Publishing Corp.'s Harvard Project Manager out-desire the others by wanting 640K bytes of memory.

Happily, this information is condensed into one place by such multitasking/windowing makers as IBM, Microsoft and Quarterdeck. Their multitasking/windowing programs need to know the memory requirements of these applications in order to run them. Actually, the multitasking/windowing programs have to know the requirements of any program in order to run it.

These requirements are recorded in a program information file (PIF); each application program gets its own PIF. Among other things, the PIF indicates how much memory a program requires and how much it desires. Even as a program, you can't always get what you want, but you might get what you need.

Swaps, speed, limitations

Even at mail-order prices, the cost of souping up a PC or PC XT to be Topview or Windows ready by adding a speed-up board, expanded memory, an EGA card and a new monitor can run more than $1,800. Most users and MIS departments already burned by claims of PC-engendered productivity boosts are going to be quite cautious about shelling out another $1,800 per person.

Indeed, companies will have to

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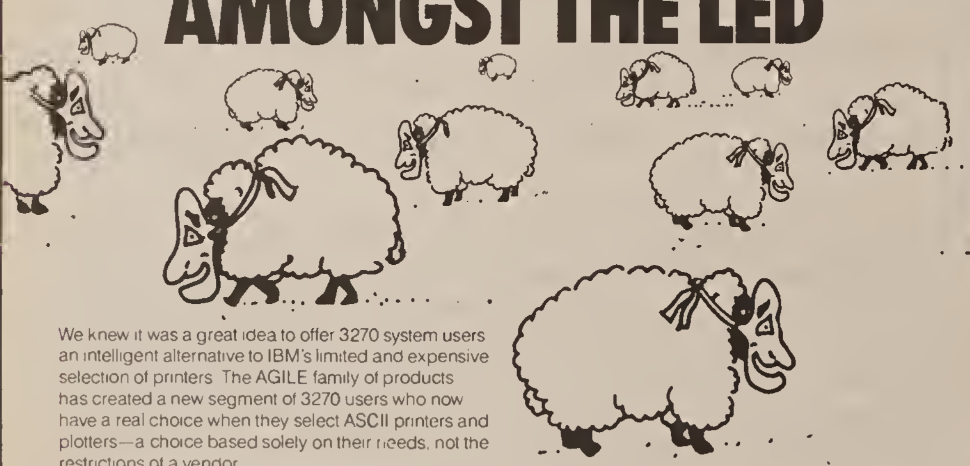

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> ***There is no exact definition of required memory. In theory, the required memory could be the barest minimum memory needed to run at all.***

weigh the questionable benefit of upgrading one workstation to a multitasking/windowing system against the opportunity to spend the $1,800 supplying PCs to new users — and maybe even equipping two new users with generic PCs for the price of one upgrade to multitasking/windowing.

Nevertheless, all is not lost if a program requires or desires more memory than is available on the system. Most of the multitasking/windowing systems can swap a program or programs out of memory onto disk to make room for another program.

Of course, from a performance point of view, swapping is not exactly free. When a program is swapped out to disk, it is stopped, frozen at some restartable point, and it and all of its data space are written to a temporary file on disk. Then the new program to be run is read in from disk and started up. This to-and-fro from disk to disk takes a noticeable amount of time and, in fact, is likely to be intolerably slow on floppy-only systems. Things go somewhat faster when programs are swapped from main memory to expanded memory (above 640K bytes) using either RAM disks or expanded memory boards.

An equally serious barrier is the processing speed of the PC and PC XT processor chip, the Intel 8088. As Gates has conceded, the chip is not up to all the work necessary to manage multitasking/windowing. Unfortunately, it is not clear that the 8086 chip in Microsoft's Mach 10 board, designed to speed up Windows, wields the muscle either. Even the 80286 chip coupled with faster 16-bit memory in the PC AT may not be sufficient.

Still another hardware limitation is the PC's graphics hardware and monitor. Users can multitask without upgrading the graphics card or buying a new monitor. But with old monochrome and CGA technology, users get coarse, clunky windows — not the high-resolution screens shown in ads and on the packaging. Users have to upgrade to an EGA if they want to see colors, and they have to move up to a fancier monitor capable of handling the EGA output if they really want to get the crispness of its higher resolution.

Power user

Some users get good results from no-holds-barred efforts to soup up their micros. Dick Yousoufian is one such user who is pleased with multitasking/windowing software. Yousoufian is president and publisher of *The Tab*, a Boston-area community newspaper based in Newton, Mass. All of *The Tab*'s 60 to 70 IBM PCs and clones are standardized on Quarterdeck's Desqview; Yousoufian swears by it. He himself is a power user. On his desk he has a strapping 10-MHz PC AT with a 3M-byte AST Research, Inc. Rampage expanded memory board.

While Yousoufian uses Desqview constantly, he praises it as more of a lifesaver for beginning users. He has Desqview installed on all of the company's PCs, virtually all of which are standard XTs with 640K bytes of memory and a 10M-byte hard disk.

Yousoufian says he has not found in all his searching an easier interface to PC-DOS than what Desqview offers. He says it is the ideal choice if a machine is to be used by a novice. The newcomer need never learn DOS commands, which Yousoufian characterizes as horrible to master. His staff uses the far more simple DOS Services feature of Desqview, which guides users through tasks such as listing files, changing directories, reformatting disks and so on.

He also says that he relies heavily on Desqview's script feature, which lets users define keyboard macros to configure the PC and start up programs automatically when the machine is first booted. This way his users have five applications packages started up for them at the beginning of the day — everything from word processing to communications. They never need to learn how to start or quit applications; they just use Desqview to switch among them.

The script feature also lets Yousoufian set up simple keystroke macros to invoke what would otherwise be tedious or hard-to-learn transfer of data from one application to another. Until now, his accounting staff needed two pieces of computer hardware on their desks — an IBM PC and a dumb terminal connected to a Tandy Corp. 6000 multiuser system running Microsoft's Xenix.

Yousoufian is now using Desqview to do away with the dumb terminal. The accountants will run a communications program in one of Desqview's nine windows. The communications program links to Xenix, so, in effect, the accounting people run Xenix in a Desqview window. When they need to pull numbers out of the Xenix system, they just use Desqview's cut-and-paste function to move the data into a PC-based application.

Yousoufian looked at other multitasking/windowing products before choosing Desqview. He deemed Windows too expensive, preferring to spend his money on Rampage memory boards rather than on buying the graphics cards and monitors required to run Windows. Desqview

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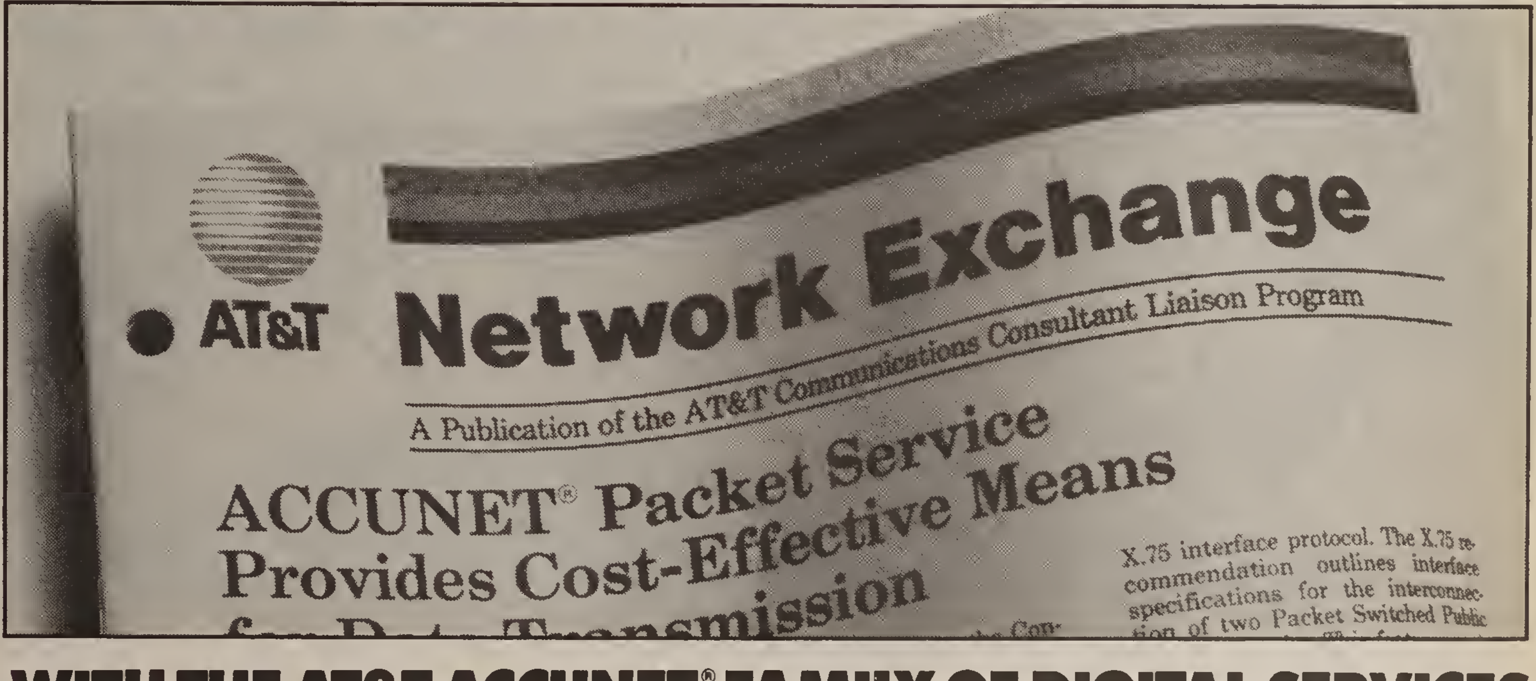
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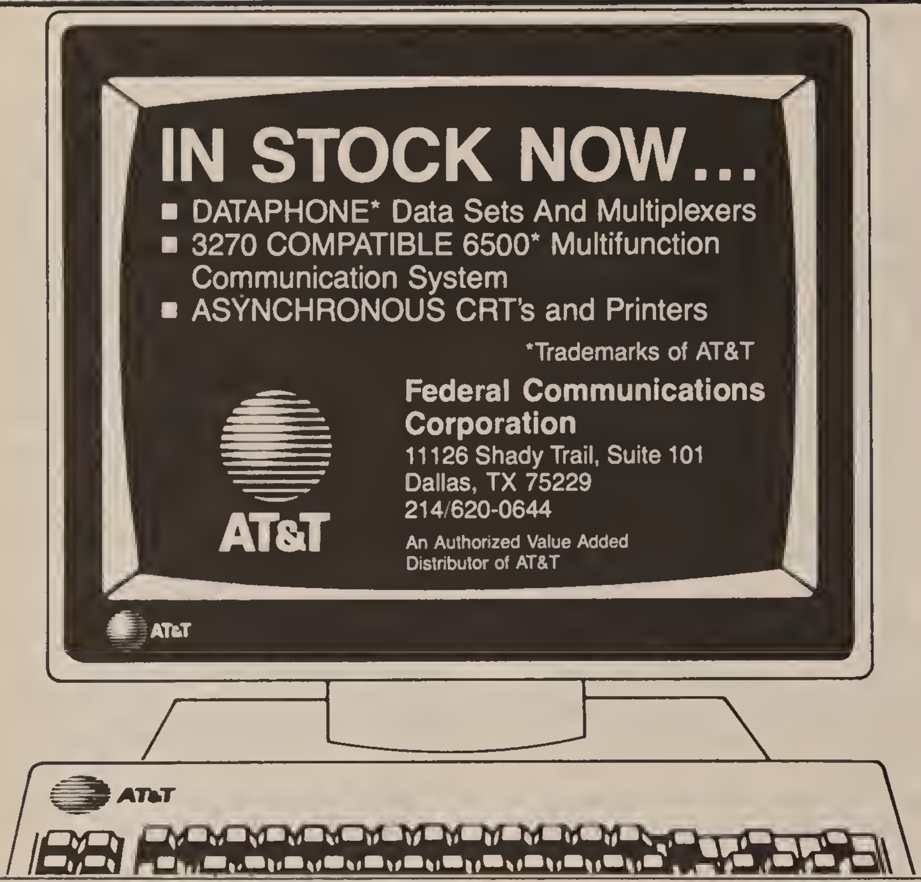

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> ***Many users will want to apply the faster processing speed or larger memory to the same programs they have been running. They may be reluctant to use up performance gains on spiffier displays or the ability to jump from one application to another at whim.***

beat the others hands down in making the PC accessible to new users or to users who did not need to be burdened with mastering a lot of DOS arcana.

Faster spreadsheets, larger data bases

Hardware barriers are not the only obstacles standing in the way of a new multitasking/windowing era of personal computing. Users have shown a certain reluctance to spend the performance gains they achieve by upgrading to faster chips or more memory on multitasking/windowing.

Instead, many users will want to apply the faster processing speed or larger memory to the same programs that they have been running. They will want to recalculate spreadsheets and print invoices faster and operate on larger data bases. They may be reluctant to use up the performance gains on spiffier displays or the ability to jump from one application to another at whim, while winding up with applications that either run no faster or are confined to data spaces that are no larger.

In addition, personal computer users may be skeptical — if not downright cynical — about software vendors and developers' claims about improvements in ease of use and productivity.

To many users who have struggled to conquer DOS and one or more application programs, multitasking/windowing products may appear to be yet another obstacle to master.

Even the product documentation for the multitasking/windowing products may prove more burdensome than users may want to bear. IBM's Topview product comes in a binder just as big as the DOS binder; users imagine it will be just as arcane.

Even Microsoft's quick reference card for Windows uses 14 panels, each five inches wide, to summarize how to interact with the product. That makes for a reference card that is just under a yard wide per side when unfolded.

Apparently, to many users, multitasking/windowing software just adds a layer of complexity. It is another moving part that may not necessarily mesh with the already too many other moving parts.

And upgrades add to the difficulty. There used to be only three things to keep in sync when vendors made changes: the PC hardware, PC-DOS and the applications programs. With multitasking/windowing software, there are now four things that users have to keep in harmony.

Keeping in touch

Despite hardware barriers and general skepticism, some users have found multitasking/windowing software to be a useful tool, particularly in its ability to integrate communications tasks into other applications.

Mark Giese, senior programmer analyst with Control Data Corp.'s Special Software Development Group, chose Windows to prototype a spreadsheet application that uses micro-to-mainframe communications capabilities.

He says multitasking/windowing software suited the particular requirements of the application, allowing it to maintain a clear path to the mainframe, on which in-depth calculations and data storage were stored, while giving the user a simple

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graphical interface to the micro-based spreadsheet.

Giese's choice of Windows was tied to the software's graphics capabilities as well as to its ability to swap out of memory when dealing with applications not written to run with it.

While he concedes that Windows works better with more memory than the PC or PC XT can offer, he thinks an investment in more powerful hardware is worth the extra expense.

Communications talk is rampant among Windows users on General Electric Information Services Co.'s (Geisco) Microsoft Windows' Developer Roundtable, according to Dan Korenzwit, manager of emerging technologies assessment at Geisco in Rockville, Md. The roundtable is available to developers through Genie, Geisco's on-line bulletin board.

Korenzwit, whose company currently uses Windows in developing prototype applications, cites the ability to integrate local activities and mainframe networking to mainframes as key to the use of multitasking/windowing tools.

Windows' graphics capabilities were a key factor in Geisco's choosing it over other multitasking/windowing environments, Korezwit says, adding that "the Windows' style of programming and user interface will be predominant."

Software a la carte

Users today often choose multitasking/windowing features a la carte rather than all at once, mainly by using existing software products that may be less general but, more important, may require less memory.

Some applications products build in their own background tasking that obviates the need for a general capability.

For example, Ashton-Tate's Framework II can run a background task to log on to Dow Jones News and Quotes service and automatically extract quotations for a portfolio of specified stocks, while in the foreground, users can continue working on a Framework spreadsheet or document.

In a similar fashion, Softklone's Mirror communications package can run as a background task — sending and receiving files — while work can continue in another program.

Even more specifically designed as software that works in background is Cygnet Technologies, Inc.'s Get package. It runs in the background and periodically checks the user's electronic mailbox. If it finds mail, the package flashes an alert in the corner of the screen, gathers the message headers and shows a preview of the waiting mail.

A soon-to-be-released version reportedly will pick up the waiting mail and copy it to disk, all in the background.

Lotus's Signal stock-quotes-by-radio system is yet another approach. In this case, special hardware in the Signal radio receiver box handles the task of pulling the stock data out of the air while work continues on the PC.

When the user application needs new stock data, the PC asks the processor in the receiver box to send it over. This emulates multitasking by combining the work of two processors, each of which performs only one task.

The advantages to these alternatives are many. They each cost less and use less memory. Since each is the only program running, the programs are very responsive and faster and easier to use than the multitasking/windowing software.

Many users who work primarily in one application but now and then need to interrupt it to do something else find their needs fairly well met by the so-called pop-up or desk accessory software packages like Borland International, Inc.'s Sidekick, Lotus's Spotlight and Warner Software, Inc.'s Desk Organizer.

These packages generally do not offer multitasking; the pop-up program does not run in the background but just sits there, and, when invoked, it freezes the main application.

Nevertheless, the pop-ups allow a user who mainly stays in one application to do incidental tasks such as record some notes, look up a telephone number or browse through files on disk.

Multitasking/windowing systems generally claim to offer easier ways to issue DOS commands (to copy, delete and rename files, for

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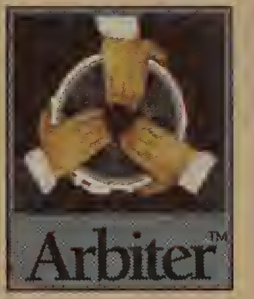

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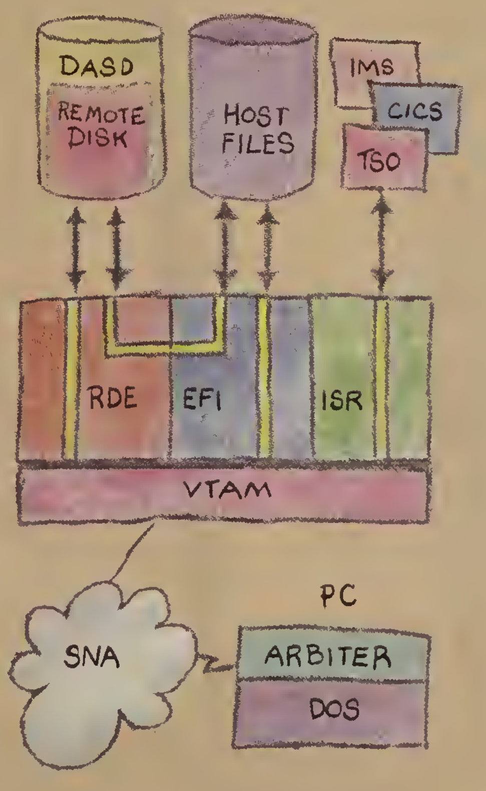

Arbiter has three components. The Remote Disk Environment (RDE) provides a seamless interface to remote disks on the host, which may be accessed by PC users or host application programs. The External File Interface (EFI) transfers data to and from files on the host and the remote disks. The Interactive Session Relay (ISR) allows "power users" to connect a PC to another mainframe subsystem–for example, TSO or CICS–without disconnecting from Arbiter.

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> ***Windows is 'a great tool, but not a solution. . . . Just putting an application in Windows doesn't guarantee anything. It is not magic.'***
>
> — **Bob Frankston**
> **Lotus Development Corp.**

example) and to navigate among disks, file directories and files.

However, users need not turn to a multitasking/windowing system just to get a simpler interface to PC-DOS. Plenty of usable or better programs already exist to help out.

There are commercial and public domain/shareware menu systems and DOS shells that simplify working with DOS. The menu systems generally allow users to fabricate batch files that post user-created menus of choices of things to do. They also allow users to convert simple function key responses into triggers for running particular applications or switching to predefined directories.

The shells are basically programs that provide a simplifying layer, or shell, on top of the operating system. They display directories and file names in windows and let users choose among these by pointing at names with arrow keys or a mouse. In addition, they let users execute PC-DOS commands by pressing function keys and sometimes by completing simple, fill-in-the-blanks dialog boxes.

Some pop-up programs also provide simplified DOS commands: Popular Programs, Inc. Pop-up Deskset's Pop-up Popdos does, as does Lotus's Spotlight DOS Filer.

Allen Sneider, a partner at the accounting firm Laventhol & Horwath in Boston and a pioneer in using microcomputers in accounting applications, says his firm has not adopted multitasking/windowing packages. He says it achieves most of what it needs by using menu software to make DOS transparent to users.

The firm has converted all of its personal computers to hard disk systems and finds that most of its applications do not need windowing. Instead, in the company's in-house staff training, the emphasis is on how to use the sophisticated features of the programs already employed, in an effort to squeeze maximum productivity out of current tools. This appears to produce more gains than investing in yet another vehicle.

'A tool, not a solution'

Removal of the hardware barriers that block widespread adoption of multitasking/windowing systems is a matter of time and price. By mid-1987, prices for major-brand, 80286-based 1M-byte systems with EGA monitors should have dropped enough to make PC AT-equivalent computers as affordable as PC XTs are today.

However, equally key is the anticipated arrival of a new version of MS-DOS (the so-called MS-DOS Version 5.0 by Microsoft) that can address the 80286's full 16M bytes of memory without resorting to an interim expanded memory-bank switching scheme.

Another problem is that Microsoft reportedly has said that MS-DOS 5.0 will include multitasking. This leaves developers and consumers wondering what exactly will become of the multitasking parts of Topview, Windows and the other multitasking/windowing offerings.

Lotus's Bob Frankston, co-inventor of Visicalc, sees Windows as "a great tool, but not a solution." He says that "just putting an application in Windows doesn't guarantee anything. It is not magic."

He predicts that the multitasking part of today's multitasking/windowing software will be folded in a future version of DOS. He is less sure what will become of the windows part of current offerings. ■

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American Association of Retired Persons

DP's move in-house pays as nonprofit group grows

By ROBERT MOSKOWITZ

Once a forgotten minority, America's senior citizens in recent years have become a formidable demographic group with impressive lobbying power in Washington, D.C., and a major membership organization to serve their needs. Much of the transformation must be credited to this organization, the American Association of Retired Persons (AARP). With some 23 million members, it is one of the largest organizations in the world.

In its nearly 30 years of existence, AARP has combined down-home pragmatism with strategic planning to improve the lot of retired and aging Americans. The organization's current day-to-day operations include maintaining its 23-million-record membership file, providing membership services, correspondence and delivering millions of renewal notices and membership cards in support of AARP.

> ”
>
> ***'We want to provide our managers with direct access to records so they can do analysis without going through MIS.'***
>
> — Wayne Haefer
> AARP

To cut costs, AARP used to rely on outside service bureaus for most of its raw processing power, but the organization recently completed and brought on-line a massive new data center facility in Lakewood, Calif., near Los Angeles.

The facility will ultimately support 10 AARP area offices. Four offices have been getting data support since January 1986. Another three or four area offices will have support by the end of the year, and the rest are scheduled to go on-line in early 1987.

Built and managed under a three-year contract with an Arlington, Va.-based systems integrator, American Management Services, Inc. (AMS), the data center will replace all AARP's existing service bureaus to provide better, faster service at a significant savings.

A nonprofit, nonpartisan organization, AARP offers open membership to anyone who is age 50 or older. The organization focuses on service, sponsoring a retired teachers division, a health-care campaign, a women's advocacy program, worker equity planning in addition to a minority affairs office.

At the bottom line, naturally, the goal for the new data center is to achieve significant cost benefits from automating systems. After extensive studies of various data processing alternatives, the association concluded that building a data center to bring DP functions in-house made good sense.

Cutting costs

Although the group is unwilling to release specific figures, AARP's payback requirements are similar to those of most other organizations. The data center is scheduled to realize a return on its investment within three years, if membership grows as has been projected. Savings come from both operational efficiencies as well as economies of scale.

Using service bureaus, AARP's transaction charges would increase proportionally with membership. With the data center, however, the organization can handle significantly larger membership files and perform additional transactions or file operations without corresponding increases in operating costs.

"The costs of the data center are relatively flat," according to Wayne Haefer, the director of the AARP's Administration and Data Management

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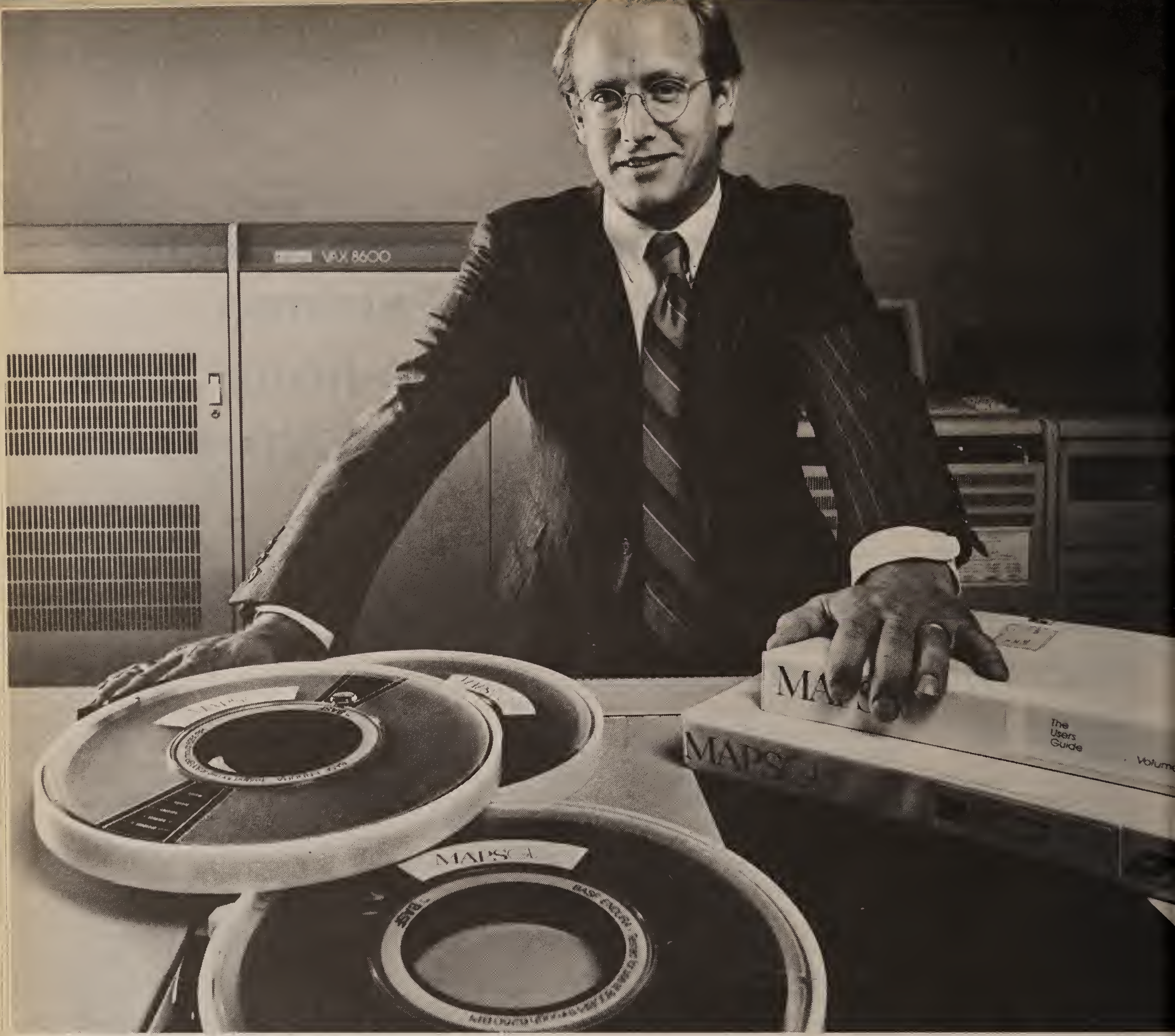
Moskowitz is a business consultant based in Woodland Hills, Calif.

PHOTO COURTESY OF AMS

The American Association of Retired Persons data center in Lakewood, Calif., target of a 23-million-record conversion.



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Division, "whether we have 23 million or 25 million members."

But as important as these savings will be, the data center's primary selling point is that it puts AARP in charge of its own information resources. AARP has always treasured its independence and felt somewhat vulnerable with its all-important data files stored on someone else's computers.

When the organization was young and small, efficiency meant farming out data processing requirements to a variety of specialized service bureaus. AARP leadership was concentrating not only on minimizing capital costs, but on holding down the need for DP specialists on AARP's permanent payroll.

But by 1980, according to Haefer, the organization had grown enough to make a major change. "We made a strategic decision in early 1980," Haefer says. "From then on, AARP began absorbing all the data processing functions we had previously farmed out."

A major objective has been for the MIS department to attain complete control over membership data processing. "The first step," Haefer says, "was to limit the service bureaus to batch processing and to hire and train AARP's own staff to take over data entry, retrieval, analysis and other front- and back-end operations."

Data processing growth

AARP data processing is divided into its membership information processing system and all other activities. Membership information processing is by far the larger segment and seems to be well in hand. The hardware configuration centers around a 24M-byte IBM 4381-14 with a bank of 3380 disk drives and 3480 tape drives. The California site communicates via 9.6K bit/sec. 3274 channels with more than 100 remote users at headquarters in Washington, D.C., and at AMS in Virginia.

Haefer is quite candid, however, about the need for AARP to do considerably more strategic planning and development in the much smaller but increasingly important nonmember area.

"We are nearly finished conducting an extensive series of interviews with all our managers, from the top to the supervisory level," Haefer says. "We're trying to find out what they see as their information needs for their particular functions and activities."

The major operations that MIS supports remain membership services and membership data processing. For example, in the four months after it came on-line, the new data center produced 1.6 million new membership cards and 2.8 million renewal cards.

AARP uses IBM's MVS/XA operating system with TSO extensions plus ISPF and IBM CICS facilities. With AMS's help, the organization chose a VSAM file structure. Third-party applications include EZ/Key, Easytrieve Plus and Panvalet by Pansophic Systems, Inc.; the UCC-1 tape management system by Uccel Corp. for tape library support; and SAS statistical analysis and reporting by SAS Institute, Inc.

Among the organization's newest services supported by MIS capabilities are its automobile and homeowners insurance programs. These are facilitated by the new data center because AARP must continually update the data systems of its insurance provider with membership status information, names and information about enrollees in the program and more. Updates were performed before the data center went on-line, but the work was a lot more difficult and time consuming.

Another example is AARP's travel service, which organizes escorted tours for AARP members. Last year most of those tours emphasized travel overseas, but now with the worries of terrorism there is more emphasis on domestic tours. This requires AARP to change its tour packages and to advise members who have previously used the travel of the changes. This can be done through AARP's own magazine and news bulletins, but the data center makes it feasible and much less

> *'I didn't want to hire someone of the caliber required to build this system because I knew we wouldn't need them after it was functioning.'*
>
> — Wayne Haefer
> AARP

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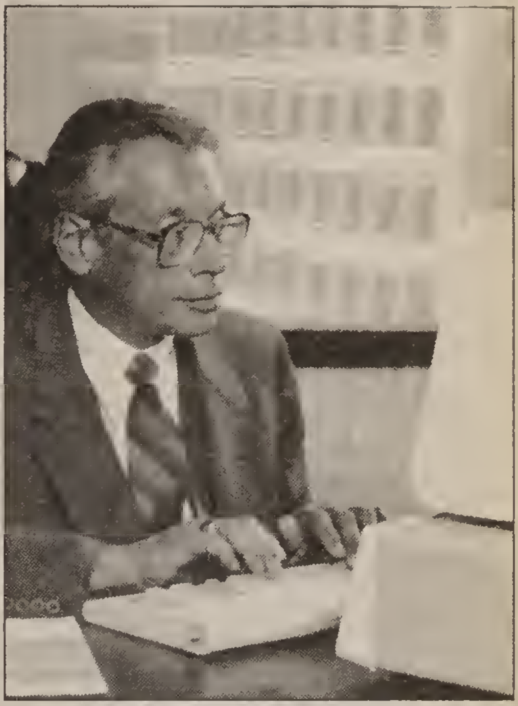

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expensive to communicate with a selected portion of the membership.

Other AARP member services include a pharmacy service, an investment program, member discounts for car rentals and hotel or motel chains, group health insurance and discounts to a major auto club. AARP education and community services range from a book series specially geared toward middle-aged and older readers to consumer affairs, criminal justice services and a housing program.

With such basic membership services assured, MIS makes commitments to develop and support the organization's other operations, which now include internal financial systems, a personnel management system and a variety of routine tasks, such as sending informative letters to members, legislators and AARP's thousands of volunteer leaders. "We have a lot of resources devoted to producing letters and selecting names and addresses from our files," Haefer says.

Although many letters go out to legislators, there is little or no computer support for lobbying or for tracking the status of proposals and bills in Congress. "We're developing access to commercial data bases on this," Haefer says, "but we also want our own system. Because we are active in each of the states, we want to track legislation through the state governments as well as in Washington."

Another function that will gain more automated support in years to come is AARP's volunteer operations. AARP traditionally maintains a small staff, and there simply are not enough people to accomplish all AARP's objectives without its army of volunteers. "We probably have 250,000 volunteers working with our staff," an AARP representative says, "irreplaceably helping with legislation work, community service, education and more."

Haefer is looking at volunteer support as a vital part of his organization's long-range effort. "We are doing a requirements analysis right now" for volunteer support, he says, "and we're hearing from volunteers that they want the ability to communicate with national headquarters to learn about what is going on. This is leading us to consider putting up a national bulletin board for information about pending legislation and other local facts.

"One operational goal we have is to provide authorized volunteers with the names and addresses of other people in the field," Haefer explains. "But we have to be careful because we allow members' names to be used only for board-approved activities. We also want to help volunteer leaders produce text to communicate with the people they are working with."

Conservative automation

One key to AARP's success in automating its major functions has been a strong focus on doing what works in the present and migrating toward more sophisticated and powerful systems only as time and money allow.

For example, converting records for 23 million members from one computer system to another is both costly and risky. Haefer assured a smooth transfer of data through careful, exhaustive planning. He cut off service from remote providers in late February and got the data center on-line in late March. During the downtime, he used parts of other automated systems to produce required membership cards but did not try to do much else.

So far, the Lakewood data center is used mainly for membership processing. AARP's older and much smaller Washington data center, in Arlington, handles the relatively tiny processing needs of nonmembership applications. As the Lakewood center expands, however, these nonmembership applications will be moved from Virginia to California and will expand significantly in scope.

With characteristic pragmatism, Haefer explains, "Part of our strategy is to use fourth-generation languages and end-user application development, but our focus at the moment is just taking over the data center."

AMS advantages

To get the move off the ground, AARP hired a systems integrator, AMS, for a limited period of time to build, staff and operate the Lakewood data center.

"When we began this project," Haefer recalls, "we had a service bureau, and we were used to getting our data processing services from outside. I didn't want to hire someone of the caliber required to build this system, because I knew we wouldn't need them after it was functioning. We decided to tap an organization with the expertise and resources to do it properly and then let them go away when it was done."

AARP chose AMS for the project after a lengthy evaluation process. At first, AARP sent request for proposals to nearly 30 vendors that were considered to have enough potential to do the job. AARP weighed the responses against an exhaustive set of criteria and selected four vendors it thought were best equipped. It then requested more information.

"We made site visits to their installations," Haefer says, "listened to what they had to say and gave them the opportunity to ask us further questions. When all was said and done, we found a place where we wouldn't be interrupted for several days and went over all the advantages and disadvantages of each vendor."

Haefer declined to name the other vendors, but he noted that AMS had significant advantages.

"First," Haefer explains, "they have a core foundation in software

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with a lot of capability that we saw we could use very well in a customized development of the membership information processing system application itself. They had a computer to use for development and at the time we didn't."

Staff considerations

AARP also decided AMS had the best staff to be assigned to this project and that the systems integrator would stay with the project to the end.

"We sensed an extremely high level of AMS corporate interest in this project," Haefer says. "In retrospect, everything we thought would be an advantage turned out very favorably."

AMS analyzed AARP's access methods and looked into performance enhancement software such as Candle Corp.'s Omegamon and Softworks, Inc.'s VSAM-Assist. In addition, AMS replaced the organization's existing high-volume, key-to-disk data entry system with a dedicated IBM Series/1 using Sides software products from Software Consulting Service, Inc.

The Lakewood data center is operated under a facility management agreement, which specifies an orderly transition from AMS to AARP control.

Under the agreement, AARP will hire a portion of the staff away from AMS in 1987 and the rest of the staff in 1988. To simplify and ease this transition, all candidates were interviewed by AARP and were told of the transition arrangement before they were hired by AMS to operate the data center.

The orderly transition assures that AARP will gain its DP independence without interrupting basic processing requirements.

One of the most important long-range goals for MIS is to deliver more and better management information.

Responding to member needs

This includes responding better to member needs and knowing exactly what combination of services each member receives. There are frequent ad hoc queries, too. For example, AARP staff in the legislative and member service departments frequently want to know details of member needs, preferences, problems and characteristics.

Because AARP is continually adding new member services and cannot afford to be hamstrung by balky or inflexible DP systems, Haefer puts particular emphasis on structuring and controlling growth. For example, AARP established an application system administrator position to oversee the proliferation of microcomputers. This administrator analyzes a request for a microcomputer, performs a systems analysis and approves or disapproves purchase.

Approval is often accompanied by recommendations for particular configurations, and many recommendations are for terminals instead of personal computers.

"Our idea," Haefer says, "is to give people what they need, to allow a mix of different brands, but to adhere to a single set of standards so we can expand in the future without unnecessary constraints."

Another goal of AARP is to redefine the role of MIS in the organization and to rethink its conception of users. Currently, end users are considered to be clerical and operations people in the organization's membership processing center.

But under the new strategic plan, AARP will expand usage to middle managers in its membership division. "Fundamentally, we want to provide more of our managers with direct access," Haefer says, "and give them access to on-line records so they can do their own analysis without going through MIS."

Analyzing member services

"One of the things we haven't had much capability for," Haefer says, "is determining what services a member is currently using. Our new file structure permits more information about this to be maintained both currently and historically.

"We also will have more demographic collection capability," he continues. Demographic information is important to AARP's planning analysts in its membership division, who are continually asking members, What else can we do for you?

"In the past, this has led to a new travel program, a new community service program, a new educational program and more. AARP wants to be able to capture more information about its members and use the data to determine additional needs.

"Over the years," he points out, "we have necessarily constructed a large number of systems. But after years of organizational growth, many of them need to be rebuilt, modified or scrapped. We are, therefore, putting a plan of action into operation to address those needs over the next five years."

Five-year plan

According to Haefer, the five-year plan goes beyond traditional systems management and gets into application development in support of strategic programs. For example, Haefer's team is already looking toward development of a project tracking application for some of AARP's community service activities and toward applying spreadsheet capabilities to some of AARP's data analysis activities.

The plan may stretch even longer than five years, however, not only because nonmember processing is a growing area, but also because there are more AARP activities not yet supported by automation than are supported.

"A lot of work with AARP is still being done manually," Haefer says. "We need to provide automated support for as many of these activities as makes sense." ■

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MANAGEMENT

TAKING CHARGE
Tom Elliott

Calculating end-user costs

There are many reasons why people do it themselves: pride of accomplishment, control, saving money. These motives, particularly that of saving money, apply as much to end-user computing as to building patios. While no one would argue that end-user computing is free, there is a pervasive feeling that it is cheap, at least in terms of out-of-pocket costs.

However, there's no such thing as a free lunch, even in the case of computing on a system that is owned by end users and does not show up on an MIS budget. Working out the full costs of end-user computing is difficult but necessary if intelligent decisions are to be made about the best ways to arrange the computing power of the enterprise.

International Data Corp. (IDC), a market research firm based in Framingham, Mass., asked senior MIS managers at a recent conference to estimate how much of their organizations' total information systems spending is primarily controlled by non-MIS end users. They responded that somewhat more than a third of information systems spending can be attributed to end users.

IDC followed this question by asking, "How 'knowable' is the answer to that question? That is, in your organization, does the information exist to answer it readily?"

Of the 157 respondents to the question, 105, or 67%, said end-user spending could be determined either precisely or within 10%; 43, or 27%, said that they would just be guessing. The rest

See **CALCULATING** page 114

Elliott is director of strategic business practices at International Data Corp. in Framingham, Mass.

Publishing systems coming

Electronic publishing may catch MIS unprepared

By Eddy Goldberg

Corporate electronic publishing systems are becoming more common, raising new management issues and career concerns as companies consider how to absorb the products into their organizations.

Publishing managers, consultants and vendors say that top management will turn to MIS managers for advice on publishing systems and that MIS managers, unaware of such interest in electronic publishing, will be caught unprepared.

GTE's Hall

Industry observers also point out that MIS managers who want control of electronic publishing must consider issues such as vendor strategies, which lead to different management structures, and the skills required of a publishing manager, which differ from those called for in data processing managers.

Some corporate electronic publishing managers have emerged from the ranks of data processing professionals, while others have come from a publishing background. There are proponents of both of these approaches.

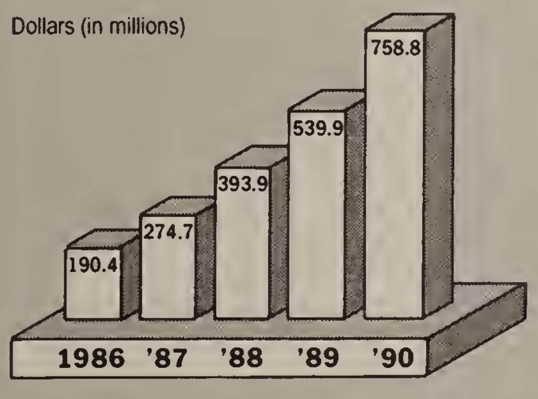
"Electronic publishing is an important new service an MIS manager can provide to his management. It's going to happen anyway; the need is there," says Robert B. Boehner, vice-president and general manager of Xerox Corp.'s electronic publishing business unit. "Top management will need the advice of the MIS manager to choose the correct system — software, operating systems, hooks to the mainframe and data base management," Boehner says.

David H. Goodstein, president of Interconsult, Inc., a Cambridge, Mass., consulting firm, claims the situation is more dire. "MIS managers need to begin to think of electronic publishing not as just another trend in product development but as a threat to their life style," Goodstein contends. "Who owns and operates the systems is more important than the technology."

One factor that could affect control of electronic publishing systems is their architectures. "During the next couple of years, there will be a fundamental battle of architecture and management styles," Goodstein says. The decentralized approach of vendors such as Xerox and Digi-

See **ELECTRONIC** page 116

Corporate electronic publishing
Estimated sales of dedicated noncommercial systems



Information provided by Dataquest, Inc.

JEFF BABINEAU

Publishers await electronic linkage

By Eddy Goldberg

While many consider the technology of electronic publishing systems fairly simple to deal with, problems can arise when users attempt to tie together equipment from different vendors.

Protocols to tie heterogeneous components together in a network are still lacking, as are standards between the major players, says Ajit Kapoor, director of electronic publishing services at Dataquest, Inc. in San Jose, Calif.

"A Boeing or a GM can do all the inte-

See **PUBLISHERS** page 116

INSIDE

Calendar: Selected conferences, exhibitions, seminars/**112**

INSTANT ANALYSIS

"The [computer] equipment is as good as the applications and the management behind it."

— Stephen S. Roach, senior economist, Morgan Stanley & Co., New York

Entrepreneurship seen key to blacks' advancement in DP

BDPA officials stress experience cross section

By James A. Martin

ATLANTA — To fully advance in data processing, blacks must work together to develop technical and communication skills and parlay their expertise into companies of their own.

That was the message that emerged from the eighth annual Black Data Processing Associates (BDPA) meeting, held here recently for some 400 attendees representing the association's 18 chapters.

"The challenge now is to recognize the good cross section of experience blacks have acquired in data processing jobs and to take that expertise and become entrepreneurs," said Earl A. Pace Jr., president of Pace Data Systems, Inc. of Philadelphia and a BDPA founder.

That challenge parallels those set forth by civil rights activists, who maintain it is not enough for blacks to get high-level jobs in corporations; they must control their own companies, Pace said. "A strong business community gives us a voice," he declared.

By networking, exchanging ideas, helping others to develop skills and providing support, black data processing professionals can begin to achieve those goals, said Gerard A. Anderson, BDPA national vice-president and a systems engineer with IBM in West Orange, N.J.

"By 1990, information processing will be restructuring the way business is conducted, and the black community needs to do what it can do to be a part of it. The goal of this organization is to help us become part of the mainstream of information processing," Anderson said. One way BDPA members try to ensure that members have the skills to advance is to pass along those skills to children. Chapters often sponsor programs to develop technical and communication skills among students. The Atlanta chapter, for example, has offered computer camps that give inner-city youths the chance to use a computer when they otherwise might not have had the opportunity.

"To make sure we are part of the mainstream, we have to offer a qualified pool of candidates for jobs in corporate America, and to do that, we need to ensure that youngsters get those skills early," said Larry Callaway, president of the Atlanta chapter and director of data base technology for American Software, Inc.

Members agree that networking among black data processing professionals is a key to moving ahead in the corporate environment or starting a company. The National Black Computer Network (NBCN), a microcomputer-based electronic information service and bulletin board, was launched to facilitate that process on a national level.

NBCN is a joint venture between Creative Computer Resources of Stone Mountain, Ga., and Personal

See **BLACKS** page 122

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CALENDAR

OCTOBER 12-18

International Tandem Users' Group 1986 Fall Conference. Chicago, Oct. 12-16 — Contact: ITUG Headquarters, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

Computer-Aided Manufacturing-International's 15th Annual Meeting and Technical Conference. San Antonio, Texas, Oct. 14-15 — Contact: CAM-I, Inc., Suite 1107, 611 Ryan Plaza Drive, Arlington, Texas 76011.

National and Federal Office Automation Conferences. Washington, D.C., Oct. 14-17 — Contact: NOAC, P.O. Box N, Wayland, Mass. 01778.

Optical Publishing '86. Oct. 15-17, New York — Contact: Learned Information, Inc., 143 Old Marlton Pike, Medford, N.J. 08055.

Scan-Tech 86. San Francisco, Oct. 15-17 — Contact: Automatic Identification Manufacturers, Inc., 1326 Freeport Road, Pittsburgh, Pa. 15238.

Computer & Business Equipment Showcase. Atlanta, Oct. 16-18 — Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

IBM, AT&T and Alternative Suppliers: Telecommunications Strategies. Washington, D.C., Oct. 16-17 — Contact: Phillips Publishing, Inc., 7811 Montrose Road, Potomac, Md. 20854.

OCTOBER 19-25

Central Prime Users Group Ninth Annual Meeting. Chicago, Oct. 19-21 — Contact: Deborah Morby, Computronics, 4N165 Wood Dale Road, Addison, Ill. 60101.

Eighth Annual Conference on Intelligent Copier/Printers. Monterey, Calif., Oct. 19-21 — Contact: Gail Montgomery, Conference Registrar, Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

Technetron '86. Boston, Oct. 19-22 — Contact: Wang Laboratories, Inc., Mail Stop 1935, One Industrial Ave., Lowell, Mass. 01851.

Third-Party and Self Maintenance Conference. New York, Oct. 20-21 — Contact: Frost & Sullivan, Inc., Department RE-828 E, 106 Fulton St., New York, N.Y. 10038.

Index '86. Boston, Oct. 20-22 — Contact: Bunny Wing-Fernhall, Executive Director, Wang Users Society of America, P.O. Box 174, De Kalb, Ill. 60115.

Unixexpo. New York, Oct. 20-22 — Contact: National Expositions Co., Suite 12A, 49 W. 38th St., New York, N.Y. 10018.

Infomatics '86. Toronto, Oct. 20-23 — Contact: International Information Management Congress, P.O. Box 34404, Bethesda, Md. 20817.

American Production and Inventory Control Society 29th Annual International Conference and Technical Exhibit. St. Louis, Oct. 20-24 — Contact: APICS, 500 W. Annandale Road, Falls Church, Va. 22046.

Electronic Linkage of International Markets. New York, Oct. 21 — Contact: Waters Information Services, Inc., P.O. Box 2248, Binghamton, N.Y. 13902.

International Symposium on Methodologies for Intelligent Systems. Knoxville, Tenn., Oct. 21-25 — Contact: University of Tennessee, Department of Conferences, 2014 Lake Ave., Knoxville, Tenn. 37996.

Software Configuration Management and Software Quality Assurance. Santa Maria, Calif., Oct. 22-24 — Contact: Software Certification Institute, P.O. Box 2328, Santa Maria, Calif. 93455.

Tenth Annual Data Entry Management Association Conference and Equipment Exposition. Las Vegas, Oct. 22-24 — Contact: DEMA, 750 Summer St., Stamford, Conn. 06901.

International Computers & Communications 1986-2000. Washington, D.C., Oct. 22-25 — Contact: IC&C, P.O. Box 17392, Washington, D.C. 20041.

Worldwide Market Opportunities. San Francisco, Oct. 23-24 — Contact: Jack Hart, International Data Corp., 5 Speen St., Framingham, Mass. 01760.

Annual Human Resources Conference. New York, Oct. 23-24 — Contact: The Conference Board, Inc., P.O. Box 4026, Church Street Station, New York, N.Y.

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Seventh Annual Computer Law Institute. New York, Oct. 23-24 — Contact: Law & Business, 855 Valley Road, Clifton, N.J. 07013.

IFMA '86. Chicago, Oct. 26-29 — Contact: International Facility Management Association, Suite 1410, Summit Tower, 11 Greenway Plaza, Houston, Texas 77046.

OCT. 26-NOV. 1

Digital Document Automation: The Emerging User. Reston, Va., Oct. 26-28 — Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

American Trucking Association Fall Workshop and Systems Demonstrations. New Orleans, Oct. 26-29 — Contact: ATA Management Systems Department, 2200 Mill Road, Alexandria, Va. 22314.

International Data Corp.'s MIS Executive Conference. Palm Springs, Calif., Oct. 26-29 — Contact: IDC, 5 Speen St., Framingham, Mass. 01701.

Fifth World Congress on Medical Informatics. Washington, D.C., Oct. 26-30 — Contact: George Washington University Medical Center, Office of Continuing Medical Education, 2300 K St. N.W., Washington, D.C. 20037.

Annual Teleconferencing Users Conference. Anaheim, Calif., Oct. 27-29 — Contact: Applied Business Telecommunications, Box 5106, San Ramon, Calif. 94583.

Data Processing Management Association Annual Computer Conference and Business Exposition. Atlanta, Oct. 27-29 — Contact: Conference and Meetings Manager, DPMA International, 505 Busse Highway, Park Ridge, Ill. 60068.

Hammer Forum 86. Cambridge, Mass., Oct. 27-29 — Contact: Hammer and Co., Five Cambridge Center, Cambridge, Mass. 02142.

Optimizing Software Productivity and Quality. Arlington, Va., Oct. 27-29 — Contact: Marriot Crystal Gateway, 1700 Jefferson Davis Highway, Arlington, Va. 22202.

Satech '86. Boston, Oct. 27-31 — Contact: 2472 Eastman Ave., No. 34, Ventura, Calif. 93003.

Token-Ring Vendor Forum. San Jose, Calif., Oct. 29 — Contact: Network Strategies Group, 1435 Koll Circle, San Jose, Calif. 95112.

Distribution Computer Expo '86 East. Parsippany, N.J., Oct. 29-30 — Contact: C. S. Report, Inc., P.O. Box 453, Exton, Pa. 19341.

Applications of Artificial Intelligence and Expert Systems. Arlington, Va., Oct. 29-31 — Contact: Learning Technology Institute, 50 Culpeper St., Warrenton, Va. 22186.

Association of Public Data Users 11th Annual Conference. Washington, D.C., Oct. 29-31 — Contact: Susan Anderson, APDU, 87 Prospect Ave., Princeton, N.J. 08544.

Computer Dealers and Lessors Association Annual Meeting. Colorado Springs, Oct. 30 to Nov. 1 — Contact: CDLA, 1212 Potomac St. N.W., Washington, D.C. 20007.

NOVEMBER 2-8

Fall Joint Computer Conference '86. Dallas, Nov. 2-6 — Contact: Stanley Winkler, FJCC '86, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

UCSD Pascal Users Society Biannual Meeting. Greenwich, Conn., Nov. 1-3 — Contact: Software Systems, Inc., 1410 39th St., Brooklyn, N.Y. 11218.

ADAPSO 65th Management Conference. Phoenix, Nov. 2-5 — Contact: ADAPSO Education Dept., Suite 300, 1300 N. 17th St., Arlington, Va. 22209.

1986 NAWGA Computer Conference and Expo. Atlanta, Nov. 2-5 — Contact: National-American Wholesale Grocers' Association, 201 Park Washington Court, Falls Church, Va. 22046.

Automated Manufacturing Exhibition and Conference. Greenville, S.C., Nov. 3-6 — Contact: Allen F. Barney, AM86, P.O. Box 5616, Greenville, S.C. 29606.

Electronic Imaging '86. Boston, Nov. 3-6 — Contact: MG Expositions Group, 1050 Commonwealth Ave., Boston, Mass. 02215.

Long Range Information Systems Planning. Washington, D.C., Nov. 3-6 — Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

Advancing Standards Technology for Distributed

See **CALENDAR** page 118

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Calculating end-user costs

From page 109

said they had no idea how precise an answer could be found.

Is the glass half empty or half full? One could say that MIS departments control more than 60% of total information systems spending and keep good track of the rest, with two-thirds of them knowing to within 10% how much is being spent by end users.

Or, one could argue that end-user spending is raging wildly out of control, with more than a quarter of the MIS departments having no idea how much is being spent outside their budgets.

The half-empty/half-full argument is a matter of point of view, but it is reasonable to assume that the percentage of information systems spending controlled by end users is rising and that MIS departments, on the whole, probably are not able to keep closer track of it.

Getting a grasp on spending

If that is the case, information systems planners need to work on getting a better grasp of what their organizations are really spending on end-user computing. If the costs of end-user computing and central computing are not calculated on the same basis, it is impossible to make good decisions about allocating information systems resources, since the one or the other will enjoy a spurious cost advantage.

To begin calculating the cost of end-user computing, let us look at four major expense categories: hardware, software, personnel and supplies and overhead.

Hardware. In most organizations, hardware costs are probably the best documented end-user expenses, if only because most hardware acquisitions can be capitalized, requiring somebody to keep at least rudimentary track of them. However, the systems most likely to be purchased by end users are personal computers, and as their prices continue downward, more of them will fall below whatever formal or informal cutoff points organizations have established for minimum capitalizable amounts. As a result, the personal computers will drop out of sight.

Moreover, a significant part of end-user hardware expenses are aftermarket purchases of additional memory, different printers, upgrades to color monitors, hard disks and so on. While it is extremely difficult to track how much is spent on aftermarket hardware purchases, it could easily amount to a quarter of the value of the installed system.

Software. Major pieces of departmental software, such as data base management systems, are likely to be adequately accounted for, particularly if the host systems are larger than personal computers and the software clearly requires the services of a systems administrator.

Small systems software purchases are much harder to track. Software spending information is particularly prone to loss if the unit cost of the software is low and the approved procedure for making purchases is perceived as cumbersome — or at least more cumbersome than using a credit card to purchase tools through a toll-free number and burying the amount on an expense report.

Personnel. This is the black hole into which much of the true cost of end-user computing disappears. Most end-user departments, even those with a substantial commitment to computing, will not be able to break out the MIS portion of the time spent by people who are not, by definition, MIS people — not programmers or data base administrators, but sales managers, secretaries and senior vice-presidents.

Nevertheless, to get a true picture of the cost of end-user computing, some estimate of who spends how much time doing what is necessary. The result may suggest that actually hiring dedicated computer personnel is cost-effective for the end-user department.

> ”
>
> ***If the costs of end-user computing and central computing are not calculated on the same basis, it is impossible to make good decisions about allocating information systems resources.***

Supplies and overhead. Expenses here also tend to be well hidden, but they can be significant. Take rent, for example. IDC has estimated personal computers in business use in the U.S. take up about 39.4 million square feet, or 11 times the area taken up by mainframes. At an average office rental rate of about $13 per square foot, this represents an annual cost of $514 million dollars.

A lot of objections can be raised, beginning with the observation that if everyone stopped using personal computers, American business would not save $514 million in rent. True. But the fact is that personal computers — not to mention their printers, desks, diskette storage boxes and paper feed trays — take up some amount of physical space that is therefore unavailable for other business activity.

Thus, a true cost accounting of end-user computing has to make some recognition of space costs.

See **CALCULATING** page 122

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Electronic publishing

From page 109

tal Equipment Corp. places electronic publishing solutions at the local or departmental level, running on distributed networks. It will be separate from MIS.

The centralized approach is typified by IBM, Goodstein says, with MIS managing the electronic publishing function as a corporate resource. "Neither approach is wrong. It will come down to individual corporate styles," he says.

Xerox's Boehner says he believes many companies will appoint a manager of documentation, skilled at both electronic publishing and data processing, as some companies already have.

That will call for straddling two different fields, Boehner says. Where data processing is concerned with accuracy and speed, electronic publishing deals with the less tangible elements of aesthetics and style in presenting graphics and choosing layouts and type fonts, he says.

Jeff Mason, general manager of IBM's recently formed Publishing Systems Business Unit, says that with many of his corporate customers, publishing is fairly well dispersed. He argues that such a strategy leaves companies without a "czar of publishing," which he says they should have.

"It could be the MIS director. Very clearly, he or she has the technology base to address that problem," Mason says. "It could be whoever owns the office function. In many cases, that is the MIS director; in some cases, it's not. In some cases, there may be a formal publishing organization that can do this."

Electronic publishing is separate from MIS at Caterpillar, Inc. of Peoria, Ill., but has "a hand-shaking, working relationship" with the data processing department, according to publishing systems supervisor Jerry Meixsell, who worked in data processing for 15 years before moving to publishing five years ago.

> *'Data processing does not understand the need for high-quality typography.'*
>
> — Jerry Meixsell
> Caterpillar, Inc.

Caterpillar has an Atex, Inc. composition system and publishes its parts catalog on its IBM mainframe. There are also "a whole flock" of IBM Personal Computers, all connected to the IBM mainframe, Meixsell says.

He agrees that electronic publishing requires skills different from those called for in data processing, but he says a DP background can be a good foundation for a move to electronic publishing.

"Data processing does not understand the need for high-quality typography," Meixsell explains, saying that line printers spewing streams of raw data were sufficient before.

"It's hard for us from data processing to understand the need for 75 different fonts, interword spacing considerations, kerning and why a publication needs to be designed by a graphic artist. These things were mystical to us," he recalls.

But Meixsell says many members of his group came from data processing.

"We recognized early on that publishing was evolving into a computerized business," he says. "The fact that we are now transplanted data processors in a publishing environment makes us really valuable to the company. We can use the technology to solve publishing problems."

The group has developed its own programs for building tables, using generic codes and paginating documents in a more efficient manner than the company's Atex system provided, Meixsell says.

Electronic publishing and MIS are also separate at GTE Government Systems Corp. of Westborough, Mass., whose manager of communications services, Russ Hall, says he believes a publishing background is best for electronic publishing managers and that electronic publishing should not necessarily belong to MIS.

In Hall's department, there is a DEC Vaxcluster with three VAX 8200s to do publications work and a local-area network for approximately 400 Apple Computer, Inc. Macintoshes and 150 IBM Personal Computers and other micros.

His department is the owner and administrator of the local-area network, which is hooked into the MIS mainframe. Data from the mainframe is downloaded into the department's spreadsheets, from which graphics can be generated.

Hall's own background is firmly on the publishing side, with experience in graphic arts, writing and editing. An early user and proponent of electronic publishing, he says that data processing and electronic publishing are different crafts and involve

See **ELECTRONIC** page 122

Publishers await link

From page 109

gration themselves," Kapoor notes, "but not everybody is a Boeing."

However, all is not rosy at Boeing Co., says David J. Becker, automation manager at Boeing Aerospace Co.'s Graphics Electronic Publishing Project. Starting as a beta user in 1984, Becker was one of the earliest users of Interleaf, Inc.'s publishing software.

Boeing's Becker

During the selection process, Becker did everything right. He involved key users, brought in experts from Boeing Computer Services Co. and other departments, sent a report detailing his needs to 20 vendors, formed a team that visited 16 vendors and attended trade shows. At the same time, Becker was designing his own system.

The Interleaf system has boosted productivity, with gains of about 40% in new input and more than 70% in the revision cycle. But today, Becker is facing serious connectivity problems.

"We're following the same evolutionary path as almost every other company," Becker says. "But we may have isolated ourselves in terms of input from other departments."

With word processing on Xerox Corp. 860 systems, Interleaf's TPS software running on Unix-based workstations and other data on a Digital Equipment Corp. 8600 and 8650, connections can be accomplished, but Becker calls them "kludgey," especially between the Interleaf and Xerox systems.

There are also Apple Computer, Inc. Macintoshes and IBM Personal Computers to connect. "This connectivity issue is eroding the glowing promises made when we bought the systems. We just didn't realize there would be such a quick requirement for total connectivity, such an absolute imperative to push that data around in revisable form," Becker says.

"I keep hearing this story everywhere," he says. "We're spending an awful lot of money on connectivity. It didn't seem to be a main requirement before."

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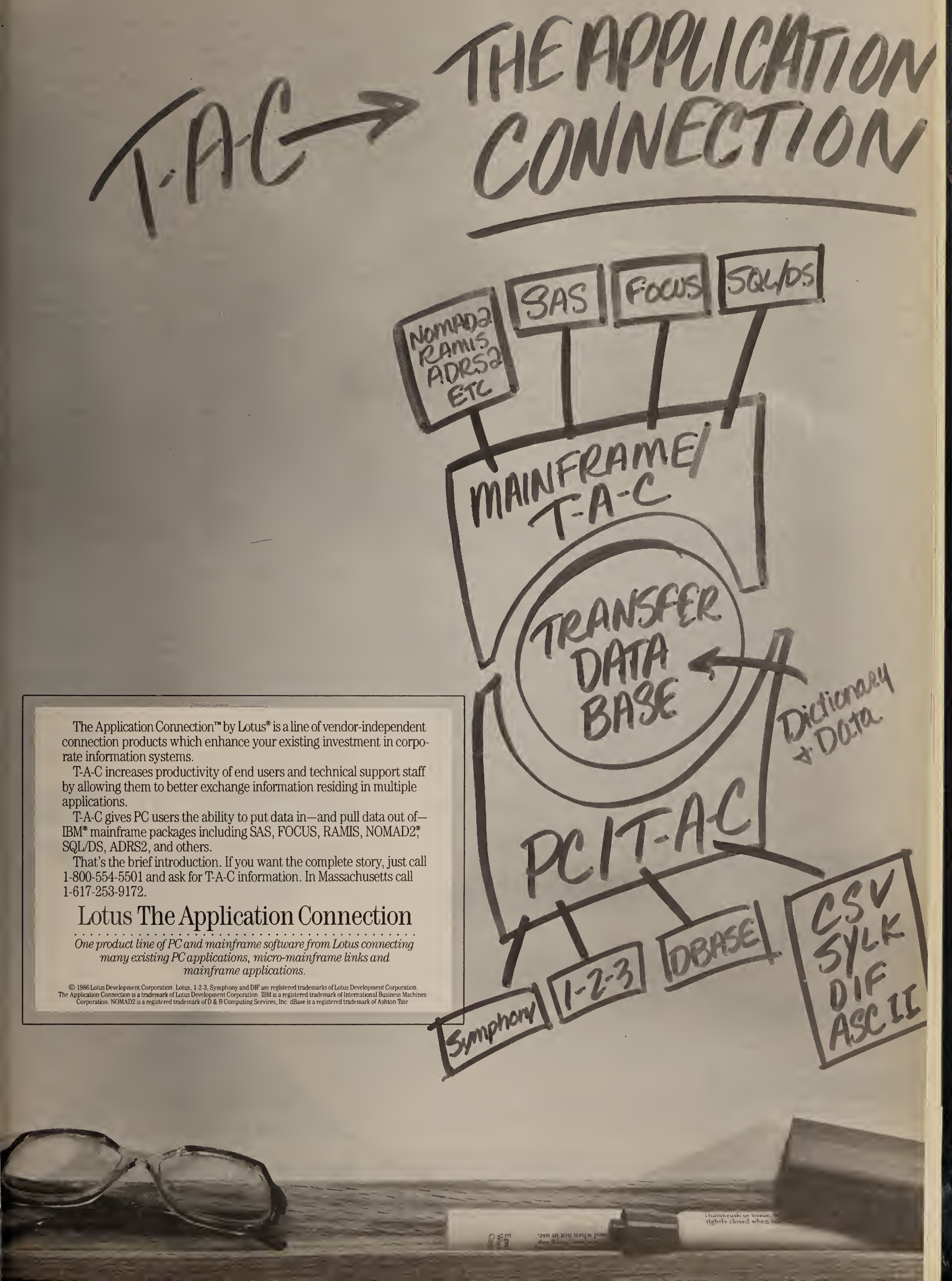

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CALENDAR from page 113

Information and Telecommunications Systems. Boston, Nov. 3-7 — Contact: Omnicom, Inc., Suite 304, 501 Church St. N.E., Vienna, Va. 22180. Also being held Dec. 15-19 in Denver.

North American Telecommunications Association Convention & Exhibition Showcase. St. Louis, Nov. 5-7 — Contact: NATA, Suite 550, 2000 M St. N.W., Washington, D.C. 20036.

Scientific Computing & Automation Conference and Exposition. Atlantic City, Nov. 5-7 — Contact: Expocon Management Associates, Inc., 3695 Post Road, Southport, Conn. 06490.

Second Annual Conference on Optical Storage for Small Systems. Los Angeles, Nov. 5-7 — Contact: Technology Opportunity Conference, 256 Laguna Honda Blvd., San Francisco, Calif. 94116.

Second Annual Software Management Strategies Conference. Toronto, Nov. 6-7 — Contact: Gartner Group, Inc., 72 Cummings Point Road, Stamford, Conn. 06902.

NOVEMBER 9-15

Information Industry Association 18th Annual Convention & Exhibition. New York, Nov. 9-12 — Contact: IIA, Suite 800, 555 New Jersey Ave. N.W., Washington, D.C. 20001.

Association for the Development of Computer-Based Instructional Systems Annual Conference. Crystal City, Va., Nov. 10-13 — Contact: ADCIS, Room 409, Miller Hall, Western Washington University, Bellingham, Wash. 98225.

Computers & Management for Contractors Conference & Exposition. San Francisco, Nov. 10-13 — Contact: Irene Nelson, Fleishman & Linden Expositions Group, 2401 Plum Grove Road, Palatine, Ill. 60067.

International Conference on Computer-Aided Design. Santa Clara, Calif., Nov. 10-13 — Contact: IEEE Computer Society, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

Comdex/Fall '86. Las Vegas, Nov. 10-14 — Contact: The Interface Group, 300 First Ave., Needham, Mass. 02194.

Autofact '86 and Sensors '86. Detroit, Nov. 11-14 — Contact: Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Educom's 22nd Annual Conference. Pittsburgh, Nov. 11-14 — Contact: Carol Parysz, Educom, P.O. Box 364, Princeton, N.J. 08540.

National Conference on Building and Operating Defect-Free Software. Orlando, Fla., Nov. 12-14 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

NOVEMBER 16-22

Introduction to Human Resource Information Systems. Seattle, Nov. 17-18 — Contact: Association of Human Resource Systems Professionals, P.O. Box 8040-A202, Walnut Creek, Calif. 94596. Also being held Nov. 20-21 in Houston, Jan. 22-23 in Fort Lauderdale, Fla. and Feb. 9-10 in Anaheim, Calif.

Strategic Issues in Managing Information Technology: Achieving Significant Improvements in Productivity and Effectiveness. Cambridge, Mass., Nov. 17-19 — Contact: Decision Support Technology, 51 Church St., Boston, Mass. 02116.

Thirteenth Annual Computer Security Conference. Atlanta, Nov. 17-19 — Contact: Computer Security Institute, 360 Church St., Northboro, Mass. 01532.

1986 CIPS Conference. Toronto, Nov. 17-20 — Contact: Canadian Information Processing Society, 5th Floor, 243 College St., Toronto, Ont., Canada M5T 2Y1.

Localnet '86, International Open Systems Conference and International ISDN Conference. San Francisco, Nov. 18-20 — Contact: Online International, 989 Avenue of the Americas, New York, N.Y. 10018.

Writing Better Computer Software Documentation for Users. Tempe, Ariz., Nov. 19-20 — Contact: Center for Professional Development, College of Engineering and Applied Sciences, Arizona State University, Tempe, Ariz. 85287.

NOVEMBER 23-30

Conference for Artificial Intelligence/Expert Systems. Boston, Nov. 24-25 — Contact: Software Tools Conference, Suffolk University, Boston, Mass. 02108.

NOV. 30-DEC. 6

Optical Fiber Communications. Colorado Springs, Dec. 1-5 — Contact: Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

DECEMBER 7-13

Financial Microcomputer Conference. Atlanta, Dec. 8-9 — Contact: Richard Yingst, Financial Managers Society, Inc., Suite 2221, 111 E. Wacker Drive, Chicago, Ill. 60601.

Optical Information Systems '86 Conference. Arlington, Va., Dec. 9-11 — Contact: Conference Management Corp., 200 Connecticut Ave., Norwalk, Conn. 06854.

International Conference on Management and Performance Evaluation of Computer Systems. Las Vegas, Dec. 9-12 — Contact: Computer Measurement Group, 6397 Little River Tnpk., Alexandria, Va. 22312.

1986 CAUSE National Conference. Monterey, Calif., Dec. 9-12 — Contact: Professional Association for Computing and Information Technology in Higher Education, 737 29th St., Boulder, Colo. 80303.

DECEMBER 14-20

Seventh Annual Data Training Conference and Exposition. Washington, D.C., Dec. 14-18 — Contact: Julia Stasio, Conference Registrar, Weingarten Publications, Inc., 38 Chauncy St., Boston, Mass. 02111.

Advanced Manufacturing Systems-West '87. Anaheim, Calif., Dec. 15-17 — Contact: John Frett or Bill Harrington, Cahners Exposition Group, 1350 E. Touhy Ave., P.O. Box 5060, Des Plaines, Ill. 60017.

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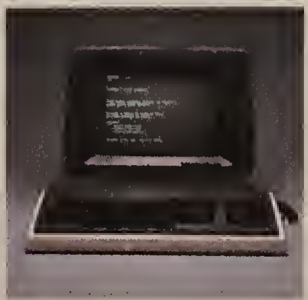

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Blacks rise in DP arena

From page 109

Computer Engineers in Los Angeles. The service, started in 1981, is also used to link small, minority-owned consulting firms and vendors with larger corporations looking for services, according to 30-year-old entrepreneur Anthony Acosta, who is a managing consultant with Creative Computer Resources.

The DP field has, in recent years, become a solid market for black female professionals, according to Vivian Wilson, Information Systems Organization manager at Ohio Bell Telephone Co. in Cleveland and vice-president of BDPA.

While only 10 years ago black women were largely confined to clerical jobs in data entry and word processing, many have become businesswomen by operating small computer consulting companies from their homes.

DP entrance more difficult

Despite these advances, it may be more difficult for blacks to enter data processing today, according to Marvin Walker, president of Combined International, Inc. and of the Chicago BDPA chapter.

"It's a lot more difficult for blacks to get into the industry, because it has become more structured. You need to have a bachelor's degree in most cases, whereas before, when I came in, the industry was brand-new, wide open, unstructured," Walker said.

According to Walker, the BDPA attempts to help trade school graduates acquire necessary skills and provide the graduates with the types of networking opportunities that will support them in their job search.

Electronic publishing

From page 116

different computer structures.

"MIS's job is crunching numbers. We crunch words," Hall says. "One school of thought is that if it has anything to do with computers, it belongs to MIS. That's just not true."

Managers' backgrounds

Hall says many of the publications managers he knows in other large corporate operations also come from a publishing background. "I think DP is an easier craft to learn than publications. There aren't really any schools for publications managers," he adds.

"DP wants control and looks at publications as an application. That's wrong. The computer is just another tool for publishing," Hall says.

As for his relationship with MIS, he says, "We try not to intrude on each other's charters."

Calculating end-user costs

From page 114

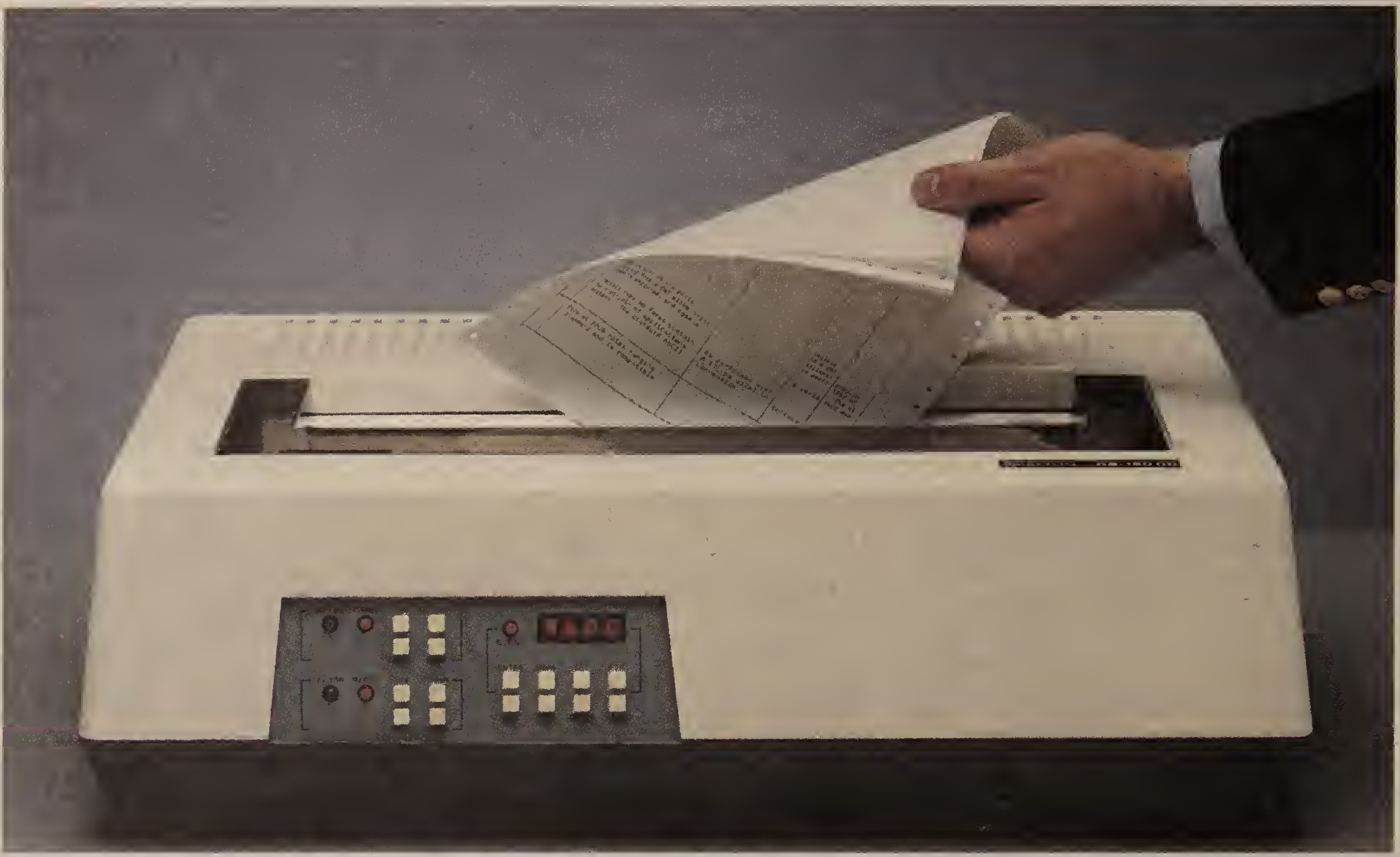
Supplies represent another area of hidden expense. Printer forms alone represented a $6.5 billion market in 1985, with about 60% purchased by end users. Similarly, the average daisywheel printer goes through a half-dozen $16 print wheels a year, resulting in a $352 million market.

However, a lot of supplies like computer paper and print wheels are bought in small quantities as "miscellaneous office supplies," and a lot more are bulked in with many other orders.

Few end-user departments are likely to take the trouble to separate computer supply purchases, except where the items in question are uniquely related to computers, such as diskettes. The rest represent a hidden expense that is very real and very large.

It is not obvious, therefore, that end-user computing is more or less expensive than any centralized alternative. Nor is it obvious that the effort to account for all costs of end-user computing is a reasonable one to make.

What is clearly desirable, however, is a better understanding of the true costs of end-user computing. Only with that understanding can MIS managers, information center managers and end users distribute the organization's computing burden in the most effective way.



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NEW PRODUCTS

VAX/VMS life cycle automated

Cortex Corp. of Waltham, Mass., has announced Corvision, an application development tool said to automate the software life cycle for Digital Equipment Corp.'s VAX/VMS environment using a technique called picture programming.

According to the vendor, Corvision is an integrated application design, development and maintenance environment that generates complex, multiuser information-processing applications directly from a visually represented design.

Picture programming allows Corvision users to create a visual representation of an application by diagramming the design at an IBM Personal Computer AT-compatible workstation linked to a central repository on a VAX. The central repository stores the application specifications, drives the format and content of the diagrams and provides the input specifications.

In the design phase, the developer can diagram a view of the application, including fields in the data dictionary, file structure, menus, screens and reports. The developer can also add custom logic to the application using an action diagrammer and a high-level language. Once the design phase is complete, Corvision generates the production-ready application for the VAX, which executes it in optimized machine code.

Corvision takes advantage of the microcomputer environment using a mouse, context-sensitive pop-up menus, windows and icons that symbolize application components. Corvision also provides a guidance system said to recommend the next logical step in the design process to the user and keep track of any incomplete design specifications.

An additional feature of the Corvision system is its ability to maintain applications from their diagrammed representations.

Corvision will be available in the first quarter of 1987. It is priced from $50,000 to $175,000, depending on the VAX model.

Mass storage tools released

Product line works with IBM PCs and compatibles

Xidex Corp. of Santa Clara, Calif., has released a line of Dysan mass storage products for IBM Personal Computers, Personal Computer XTs and compatibles. The products include the Dysan Filecard; an internal, 3½-in. Winchester drive on an expansion card, available in 10M-byte and 20M-byte versions; the Dysan Tapefile, a ¼-in. tape cartridge subsystem; and the Dysan Portafile, a portable, 20M-byte, 3½-in. Winchester drive.

According to Xidex, one of the advantages of the mass storage products is that they deliver added storage options to PC users without reconfiguration or removal of the system's existing drives.

The Dysan Filecard is a half-size controller board with a small Winchester disk drive attached. The entire package is said to fit into a PC's expansion slot, requiring no cables or extra desktop space. The Filecard leaves half of the adjacent slot free for an additional short board. Two Filecards can be added for greater storage, according to the vendor.

The 10M-byte version comes with an add-on memory board, the Enhancer, which gives users up to 512K bytes of additional random-access memory. The 10M-byte Filecard costs $795, and the Enhancer board costs $99. The 20M-byte Filecard, which is said to provide the same small footprint and ease of installation as the 10M-byte version, costs $895.

The Dysan Tapefile, said to offer a capacity of 60M bytes, reportedly offers the footprint of a half-height floppy drive. The ¼-in. tape cartridge subsystem frees up hard-disk space by fitting into a floppy drive cavity. Tapefile is offered with backup software. The system is priced at $1,095.

Xidex's Portafile, a 3½-in. Winchester with 20M bytes of storage capacity, can be connected to a PC, then unhooked and carried by its built-in handle. The Portafile weighs 7 lb. According to Bob Allen, product manager for Xidex's Data Products Division, the Portafile makes an effective portable data base for users who operate more than one computer, because it eliminates the need to copy data for the second machine. Portafile costs $1,495.

CMS sort/merge aid upgraded

Syncsort, Inc. of Woodcliff Lake, N.J., has introduced Release 6.0 of Syncsort CMS, its sort/merge product for IBM VM/CMS environments.

According to the vendor, Release 6.0 provides start I/O resource savings of 30% to 60%, virtual time reduction of 10% to 30% and total time reduction of 10% to 30%.

Under Release 6.0 control, statements and Sortwriter features do not require the use of sort-work data sets. An interface provides expanded support for programs and user exits written in Cobol, Fortran and PL/I.

A full-screen installation procedure is available for installing the Help facility and setting and modifying installation options. Release 6.0 can also be installed as a discontiguous saved segment.

Spanned variable-length records in the I/O files are supported, and up to 16 virtual addresses are supported for tape I/O files under VM/SP 4.

Sortwriter, Syncsort CMS' report writing facility, has been enhanced to allow data fields from records to be included in report, page and section headers and trailers. The count feature now allows the number of records to be counted at section, page and report levels, and the subcount feature provides cumulative record counts.

Enhancements have also been made to the record formatting functions of Syncsort CMS, and a compare feature allows two 'files to be compared without being sorted.

Release 6.0 of Syncsort CMS can be licensed at a rate of $9,300 for three years.

INSIDE

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```
             IBM
printf("Hello, world\n");
            ^
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The mainframe compiler uses standard IBM linkage conventions. Assembler programs, MAIN routines in other high-level languages, and packages such as IBM's ISPF and GDDM can be invoked directly from C.

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SOFTWARE & SERVICES

Systems software

Aim Technology has added the Project Accounting Option to its **Aim Job Accounting** package.

The Aim Job Accounting package tracks AT&T Unix System V resource usage, allocates system resource charges to users and generates charge statements, the vendor stated.

The Project Accounting Option is said to allow users to track System V resource usage by projects and specific tasks within projects in addition to tracking them by users and users groups.

The Project Accounting Option costs $2,000.

Aim Technology, Suite 203, 3350 W. Bayshore Road, Palo Alto, Calif. 94303.

■

Pansophic Systems, Inc. has ported three of its **D-Pict** graphics software products to IBM MVS and VM/CMS mainframes.

D-Pict/GKS reportedly allows users to program graphics applications with access to the graphical kernel system level 2b. D-Pict/Graphkit is a library of 25 subroutines that can be used to create custom business graphics applications.

D-Pict/VGL, the virtual graphics language, reportedly provides a library of more than 300 graphics subroutines that can be used to build device-independent, two- and three-dimensional graphics applications.

D-Pict/GKS and D-Pict/VGL cost from $26,300 for a single CPU; D-Pict/Graphkit with D-Pict/VGL is priced from $37,500 for a single CPU.

Pansophic Systems, 709 Enterprise Drive, Oak Brook, Ill. 60521.

■

Version 4.3 of **Project Time Management** (P/TM), a multiuser project-costing and financial accounting system, has been released by **Alpine Datasystems, Inc.**

Version 4.3 includes the addition of a Budget Feedback Report and an expanded reporting capability.

The P/TM package runs on Digital Equipment Corp.'s PDP/11, Micro PDP/11, Microvax and VAX hardware. It costs from $1,000, depending on the operating system.

Alpine Datasystems, U.S. Bank Tower, 111 S.W. Fifth Ave., Portland, Ore. 97204.

■

Control Data Corp. has released its **Plant Design Management System** (PDMS) software.

With PDMS, designers can reportedly build a three-dimensional, full-scale model of a plant, including all pipes, vessels and structural components. Features of the system include schematic creation for design and drafting and the ability to evaluate alternatives and eliminate errors in the analysis phase.

The system runs on CDC's mainframes and the combined cost of hardware and software for PDMS ranges from $5,000 to $15,000 per month, depending on design workstation.

CDC, 8100 34th Ave. S., Minneapolis, Minn. 55420.

■

Release 4.1 of **SAR**, the Sysout Archival and Retrieval system, has bowed from **JCA Software, Inc.** and **Essential Software, Inc.**

SAR is said to archive job control language listings for compilation listings, production reports and system log and to highlight exception conditions. Release 4.1 incorporates a data base management system and a terminal management system that aids in controlling the on-line retrieval options that are built into SAR, the vendor said.

Another feature of the release is that archived data is kept in compressed form, thereby using minimum storage.

SAR runs on IBM MVS and MVS/XA operating systems.

SAR costs $15,000.

JCA Software, 18201 Von Karman Ave., Irvine, Calif. 92715.

■

Charles River Data Systems, Inc. has enhanced **Unos**, the operating system kernel of the company's UN/System V operating system.

Unos reportedly supports real-time applications and runtime environments. The enhancements are said to increase system performance and disk storage capacity and improve compatibility with AT&T's Unix System V.

The revision also supports 540M-byte Winchester disk drive systems and Charles River's 3.5 million instructions per sec., VMEbus-based, Motorola, Inc. 16.7-MHz 68020 central processor and the 16.7-MHz 68881 floating-point coprocessor.

The Unos revision costs $3,000.

Charles River Data Systems, 983 Concord St., Framingham, Mass. 01701.

■

Version 4.0 of **SuperPDL** has bowed from **Advanced Technology International, Inc.**

SuperPDL is a Digital Equipment Corp. VAX-oriented interactive design tool for software engineers. It is said to allow users to benefit from on-line design analysis and consistency checking. Included in Version 4.0 is a full interface to DEC's Code Management System, running on VAX/VMS.

Other features of Version 4.0 include calling tree report modifications, said to support the introduction of multiple roots into a project, and a function that allows components from one SuperPDL project to be physically moved to another.

Version 4.0 costs from $14,000 to $30,000, depending on the host VAX.

Advanced Technology International, 19th Floor, 350 Fifth Ave., New York, N.Y. 10118.

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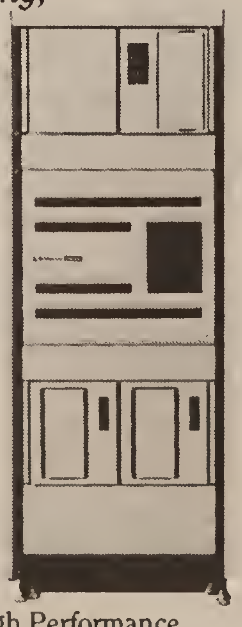
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BIMCMPRS — CICS 3270 data compression system. Reduces response time for remote terminals significantly. **DOS** and **OS.**
BIM-FMAP — CICS BMS on-line map generation and maintenance. **DOS** and **OS.** NEW
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BIMCNSOL — Multiple/Remote System Console function for CICS. Display-only or full input/display versions available.
BIMMONTR — DOS/VSE System Status, Performance Measurement, and POWER Queue display.
BIMSUBMT — On-line Job Edit and Submission facility.

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NEW PRODUCTS/SOFTWARE & SERVICES

Software Results Corp. has introduced **PET**, said to be a capacity planning and performance evaluation package for Digital Equipment Corp. VAX/VMS and PDP-11 systems.

PET collects system performance statistics from the CPU, disks and all I/O devices to provide daily and monthly summaries in both graphic and report form, the vendor stated. It uses the leftover resource evaluation method to monitor the performance of multiple system resources and also has load simulation, or benchmarking, capabilities.

PET costs from $3,000 to $6,000, depending on the operating system.

Software Results, 2887 Silver Drive, Columbus, Ohio 43211.

■

Sun Microsystems, Inc. has announced the availability of Swanson Analysis Systems, Inc.'s **Ansys 4.2** finite element modeling and analysis software on its Sun-3 workstations.

Ansys software is said to help mechanical engineers create, analyze and modify computer-aided engineering and computer-aided design models of products or structures for structural, electromagnetic, fluid or heat-transfer properties.

Ansys on Sun-3 is licensed at $2,200 per month.

Sun Microsystems, 2550 Garcia Ave., Mountain View, Calif. 94043.

■

Visual Engineering, Inc. has ported its **Visual** family of graphics software to Silicon Graphics, Inc.'s Iris 3000 series of superworkstations.

Graphics software available on the Iris series include two- and three-dimensional development tools and presentation graphics for programmers and nonprogrammers. Also included is Visual:Graphcap, a graphics device management system that allows all Visual software to support any graphics device through a data base of user-modifiable entries, the vendor said.

Visual:Prochart costs $3,000; Visual:C-chart costs $2,950; Visual:GKS costs $1,995; and Visual:Genisys costs $8,000. All products include Visual:Graphcap for device support.

Visual Engineering, Suite 200, 2680 N. First St., San Jose, Calif. 95134.

Applications packages

Software International Corp. has enhanced its **Payroll system** for Wang Laboratories, Inc. VS computers.

The Payroll System reportedly handles up to 40 different voluntary deductions and features on-line file maintenance processing with immediate update capabilities. New features include multicycle processing, user-defined miscellaneous fields and multiple earnings types. The product also incorporates expanded money fields, on-line Help screens and 401K reporting.

Lease price for a copy of the Payroll system for VS computers ranges from $15,000 to $24,500.

Software International, One Tech Drive, Andover, Mass. 01810.

■

Baker Technologies, Inc. has announced **Diskette/W2**.

Diskette/W2 is said to allow any IBM System/34 or 36 user to submit year-end Federal W-2 reports on 8-in. diskettes. Diskette/W2 is said to meet all federal regulations. It can also interface with any standard IBM MAPICS, distributors management accounting system or construction management accounting system payroll application.

Diskette/W2 is priced at $425 and includes source code.

Baker Technologies, Suite 495, 5929 Baker Road, Minnetonka, Minn. 55345.

■

NUS Operating Services Corp. has enhanced its computerized maintenance software program, **MMP/Mini**, for the IBM System/36 and 38 and Digital Equipment Corp. VAX and Microvax II computer systems.

Features include an equipment data base, backlog planning, preventive and corrective work order processing, maintenance history, cost and maintenance problem analysis, inventory control and purchase order processing.

The price for the program ranges from $50,000 to $75,000, the vendor stated.

NUS Operating Services, 910 Clopper Road, Gaithersburg, Md. 20878.

Absolut Software Co. has unveiled **Smart**, multiuser software for sales management activity reporting and telemarketing.

Smart reportedly makes it possible to manage unlimited numbers of prospects and field and telemarketing sales agents. It provides 16 data fields for customer and prospect demographics and follow-up dates.

Quotations are generated, tracked and easily converted to orders. The product interfaces with office automation products, allowing word-processed correspondence to be sent to prospects listed in the Smart data base.

Smart runs on AT&T Unix System V-based computers.

Smart costs from $8,000.

Absolut Software, 2001 Beacon St., Boston, Mass. 02146.

■

Computing Capabilities Corp. has released **Version B.02** of **Maestro** for Hewlett-Packard Co.'s 3000 computers.

Maestro is said to automatically schedule and manage job processing according to calendars and operating rules specified by the user. Enhancement features include calculation of date parameters for users' jobs, increased multiple-CPU processing options and improved Help format.

Maestro costs from $4,800 to $12,700. Current users will receive the upgrade at no extra charge.

Computing Capabilities, Suite 122, 465-A Fairchild Drive, Mountain View, Calif. 94043.

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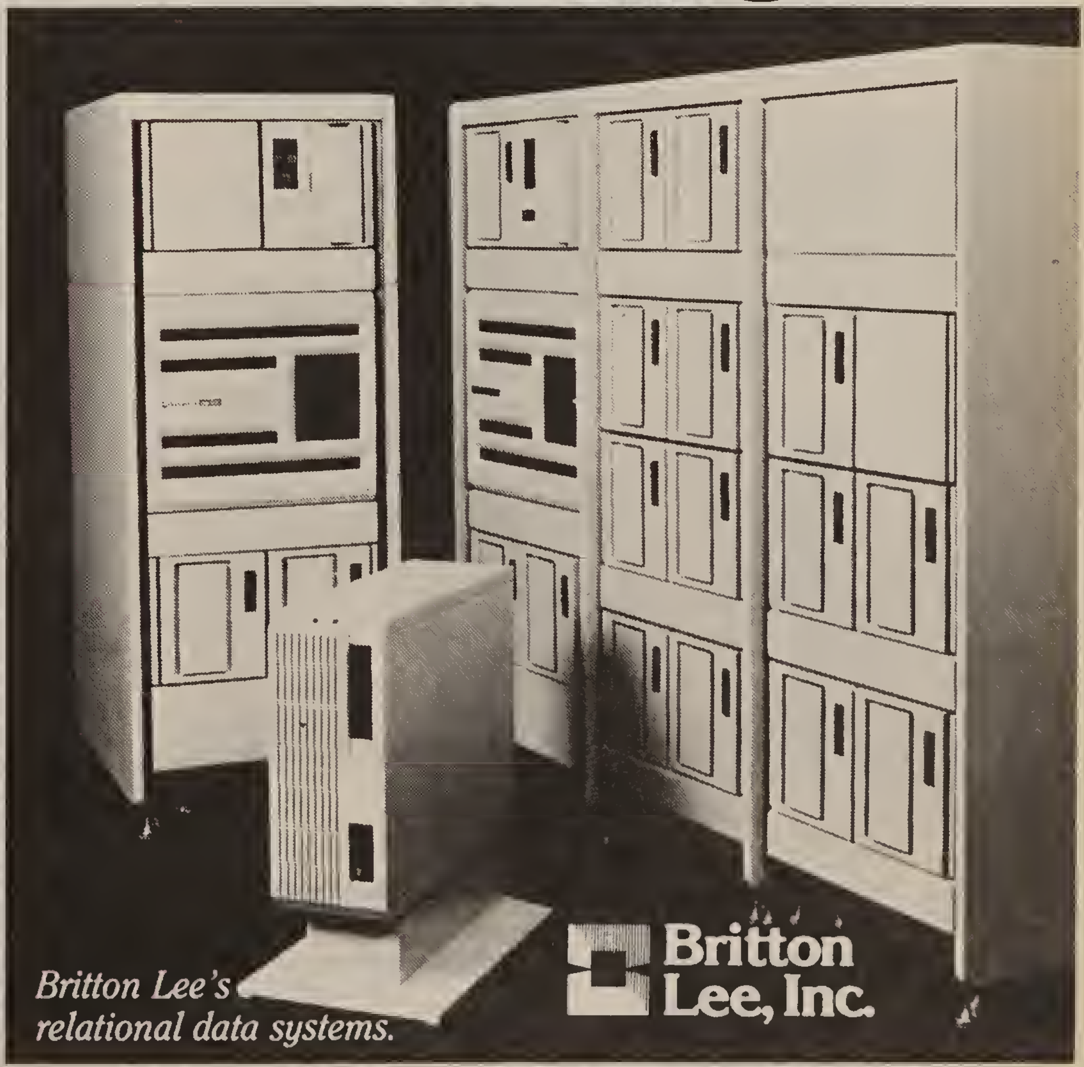

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NEW PRODUCTS/SOFTWARE & SERVICES

Information Builders, Inc. has introduced **Focman**, a Focus-based project management system that runs on IBM mainframes.

Focman is said to allow managers to deliver complex projects on time and on budget. It offers interactive color graphics, Focus Universal Data Access and an unlimited number of allowable projects, activities, resources, calendars and interdependencies.

Focman reportedly allows users to define a project, analyze time and resource requirements, perform critical path analysis and monitor project cost.

Focman costs $22,000.

Information Builders, 1250 Broadway, New York, N.Y. 10001.

■

New England Systems, Inc. has introduced a distribution control techniques package, called **Discotec**, for the IBM System/36.

Included in Discotec are modules for order entry and invoicing, inventory, purchasing, accounts receivable and payable, sales analysis and general ledger. The package reportedly consists of a fully integrated application code to allow standard data processing.

Discotec costs $18,500.

New England Systems, #16, 200 Center St., Ludlow, Mass. 01056.

■

Armor Systems, Inc. has announced the **Excalibur Plus Payroll** module for IBM mainframes and compatibles.

The Excalibur Plus Payroll system is said to accommodate hourly, salaried, commissioned, contract, tipped and salary/coefficient employees. The system calculates and tracks employer costs for state unemployment and state disability insurance; workers' compensation; and employee sick, vacation and personal leave pay, according to the vendor.

It also performs payroll-related job-costing tasks for specific jobs and handles direct deposits.

It costs $695 for the module.

Armor Systems, 324 N. Orlando Ave., Maitland, Fla. 32751.

■

Axis Computer Systems has announced the availability of its **AX/IOM MRP-II** software on AT&T's Unix System V operating system.

The software is said to provide solutions for the following three manufacturing environments: make to stock, assemble/configure to order and make to order/job shop.

Pricing for the AX/IOM MRP-II begins at $45,000 and is based on the number of users, the vendor said.

Axis Computer Systems, 730 Boston Post Road, Sudbury, Mass. 01776.

■

MCBA, Inc. has introduced its **Standard Product Costing** manufacturing package for Wang Laboratories, Inc. VS computers.

The package is said to accurately maintain standard or estimated costs for both manufacturing and accounting management. It also records current and projected costs for all products, parts and services provided by a company, the vendor said. The package supports both standard and current costs and provides critical ratios such as gross margin percentages and cost variances.

The Standard Product Costing package costs from $4,000 to $7,500, depending on the VS model used.

MCBA, 425 W. Broadway, Glendale, Calif. 91204.

■

Napersoft, Inc. has released **Naper-Word**, a software product said to provide word processing functions to mainframe computers.

Naper-Word reportedly emulates the IBM Displaywrite system. It offers full-function, menu-driven word processing; personalized mail and merge correspondence; on-line batch impact; laser printer support; and electronic document transfer, the vendor said.

Naper-Word runs on IBM mainframes operating under DOS/VSE, OS/VS1 or MVS. It ranges in price from $10,000 to $20,000, depending on the operating system. Software maintenance costs an additional $1,500 to $3,000 per year.

Napersoft, One Energy Center, Naperville, Ill. 60540.

■

Trax Softworks, Inc. has announced **Release 3.1** of **ESS**, its electronic spreadsheet for mainframes.

New features include prefix commands for greater flexibility in manipulating rows and columns and improved performance in terms of disk space, memory requirements and CPU utilization. ESS is also said to be re-entrant, which means that users can save memory by sharing the same copy.

Other features are said to include commands to search for text and values and a user-function facility that allows the user to include functions written in Assembler, Cobol or Fortran languages.

ESS runs on TSO, VM/CMS, CICS and Applied Data Research, Inc. ADR/Roscoe. It is priced from $8,000 to $15,000, depending on the CPU.

Trax Softworks, 10801 National Blvd., Los Angeles, Calif. 90064.

Languages

Zanthe Information, Inc. has ported **Zim**, its fourth-generation language and data base management system, to Digital Equipment Corp.'s VAX.

Zim is said to offer an active data dictionary, query language, screen painting forms management system, report generator and fourth-generation programming language with a common syntax. Applications can be run in interpretive mode, compiled mode or a mixture of both.

Zim starts at $700 for the VAX/VMS and $3,500 for the Microvax II system.

Zanthe Information, 1200-38 Antares Drive, Nepean, Ont., Canada K2E 7V2.

■

BBJ Computers International has ported **Today**, its application generator, to the Digital Equipment Corp. VAX VMS environment.

Today is said to be a self-contained, visually oriented fourth-generation language that insulates users from the host computer's operating system.

Features of Today include capabilities for multiversion application tailoring, interactive end-user training, structured documentation preparation and a full set of administrative security functions for managing the application maintenance and enhancement process.

The license for Today ranges in price from $12,000 to $30,000, depending on the host computer.

BBJ Computers International, 2946 Scott Blvd., Santa Clara, Calif. 95054.

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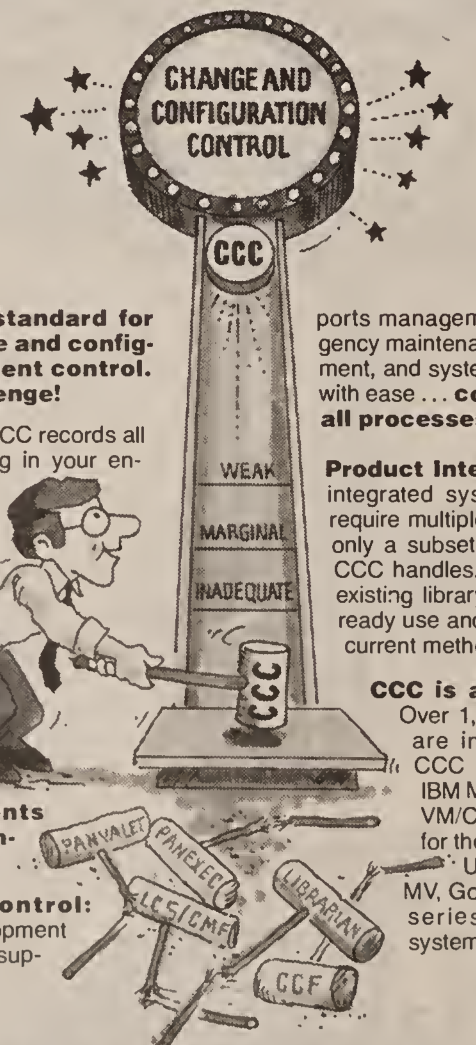

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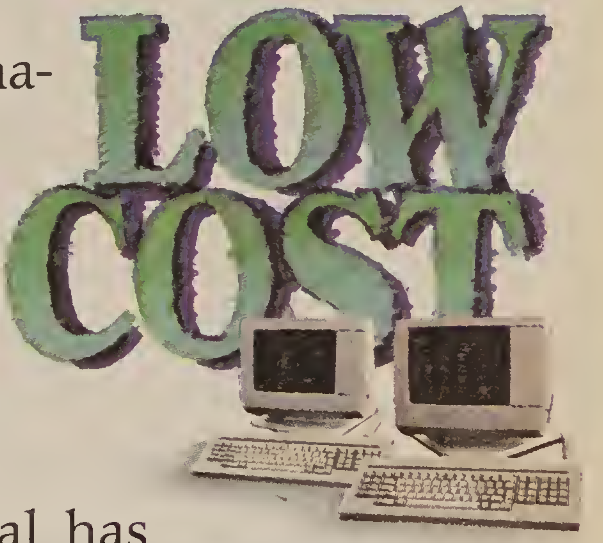

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Mitrol, Inc. has released **Version 10.0** of **Mitrol,** the company's fourth-generation language that runs on IBM mainframes.

Version 10.0 is said to offer macro generation and regeneration enhancements, added macro variables, image-copy and dataset-copy utility, service user capability for MVS multiusers, two requests — Disallow and Sleep — and the removal of Unique Path Limitation in Create syntax.

Version 10.0 is also capable of accessing non-Mitrol data bases via external interface, the vendor said.

Mitrol is priced from $80,000.

Mitrol, 800 W. Cummings Park, Woburn, Mass. 01801.

Utilities

Prime Computer, Inc. has announced its **Medusa-to-Autocad translator** and **Structural Design and Analysis Interface** (SDAI).

The Medusa translation to Autodesk, Inc. Autocad occurs via Primelink, Prime's personal computer-based software that links Microsoft Corp. MS-DOS- and IBM PC-DOS-based PCs to Prime's 50 series minicomputers. Medusa software allows users to modify designs while maintaining file libraries of designs and data generated by Autocad software.

SDAI allows structural engineers to design steel or concrete structures within the Prime Medusa AEC software environment.

The translator costs $7,000 for the Prime office environment system and $9,000 for use on a computer room system. SDAI costs $6,000 and $8,000, respectively.

Prime Computer, Prime Park, Natick, Mass. 01760.

■

Inference Corp. has ported **Art**, the company's automated reasoning tool, to Sun Microsystems, Inc. Sun-3 workstations.

Art is an expert system building tool with graphics. It runs under Sun Common LISP with a special front-end from Inference offering graphics support for windowing and drawing capability. Art on Sun-3 workstations is said to allow Art developers to build portable sytems using the Sun AT&T Unix platform.

Art on the Sun-3 is priced at $65,000.

Inference, 5300 W. Century Blvd., Los Angeles, Calif. 90045.

■

Axios Products, Inc. has announced **Dimsum**, said to provide a means of creating data language/1 (DL/1) test data on-line, modifying test data immediately and inspecting test results without waiting for batch turnaround.

The product reportedly gives programmers the ability to perform a range of useful functions such as creating and manipulating test data, patching production errors, initializing the data base, browsing all segments of an IMS program and learning various options of DL/1 right on the screen.

Dimsum costs $7,500. It operates under IBM CICS or OS/VS systems.

Axios Products, 1455 Veterans Highway, Hauppauge, N.Y. 11788.

■

Isomorphic Systems, Inc. has introduced **ISO Form**, an information retrieval product for the MVS/TSO environment.

The product is said to be an on-line interactive system that does not use a language. ISO Form connects to existing Cobol record definitions and can access multiple record-type files and linked sets of files without programming, the vendor stated.

Nontrivial reports for batch production or on-line ad hoc queries are produced by report generators, which are created interactively without the use of syntax and are stored in a library for modification and re-use.

ISO Form costs $35,000.

Isomorphic Systems, Suite 300, 1103 Westgate, Oak Park, Ill. 60301.

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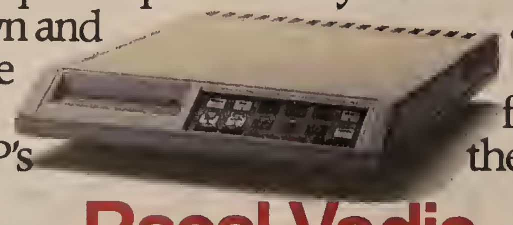

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The Electronics Group

Ivan Software, Inc. has released **Ivan-Lib/Ivan-Edit 6.0**, an enhanced version of the company's full-screen text editor and file librarian for NCR Corp.'s virtual resource executive operating system.

Features include parameter substitution; a save-screen option; new administrator functions, including a password-protected interlibrary member-copy utility; a command to perform column-oriented modifications to one or more consecutive records in a work file; and an enhanced job status display.

Ivan-Lib costs from $2,500, and Ivan-Edit costs from $1,000 to $5,000.

Ivan Software, 120 N. Keowee St., Dayton, Ohio 45402.

■

Application Technologies, Inc. has announced the availability of **Secure/36** for the IBM System/34 and the System/36.

Secure/36 is said to be a nonprogrammer security. Without using a programmer, the system security officer can provide menu option security, limit various users to specific menu options and track and store user history by menu option, according to the vendor.

Secure/36 is priced at $495.

Application Technologies, Suite 495, Baker Technology Plaza, 5929 Baker Road, Minnetonka, Minn. 55345.

■

Software Technologies & Research, Inc. has released **VM Level,** a VM resource monitor that automatically analyzes key VM control indicators.

VM Level is said to adjust a VM user's priority during peak resource utilization periods and restore the user's priority to its previous level once that user's requirements drop to less than a specified percentage of VM resources. It monitors the usage of CPU, memory and I/O, the vendor said.

VM Level is priced at $3,500.

Software Technologies & Research, 160 West St., Cromwell, Conn. 06416.

■

Software Technologies & Research, Inc. has introduced **Filesafe**, an MVS batch utility said to provide forward recovery functions for VSAM files and journal management functions for IBM's CICS and batch journals.

Filesafe offers the following five separate system functions: recover files, simulate a recovery process, copy or merge journals, analyze journals and create batch program journals, according to the vendor.

Filesafe is priced at $5,500.

Software Technologies & Research, 160 West St., Cromwell, Conn. 06416.

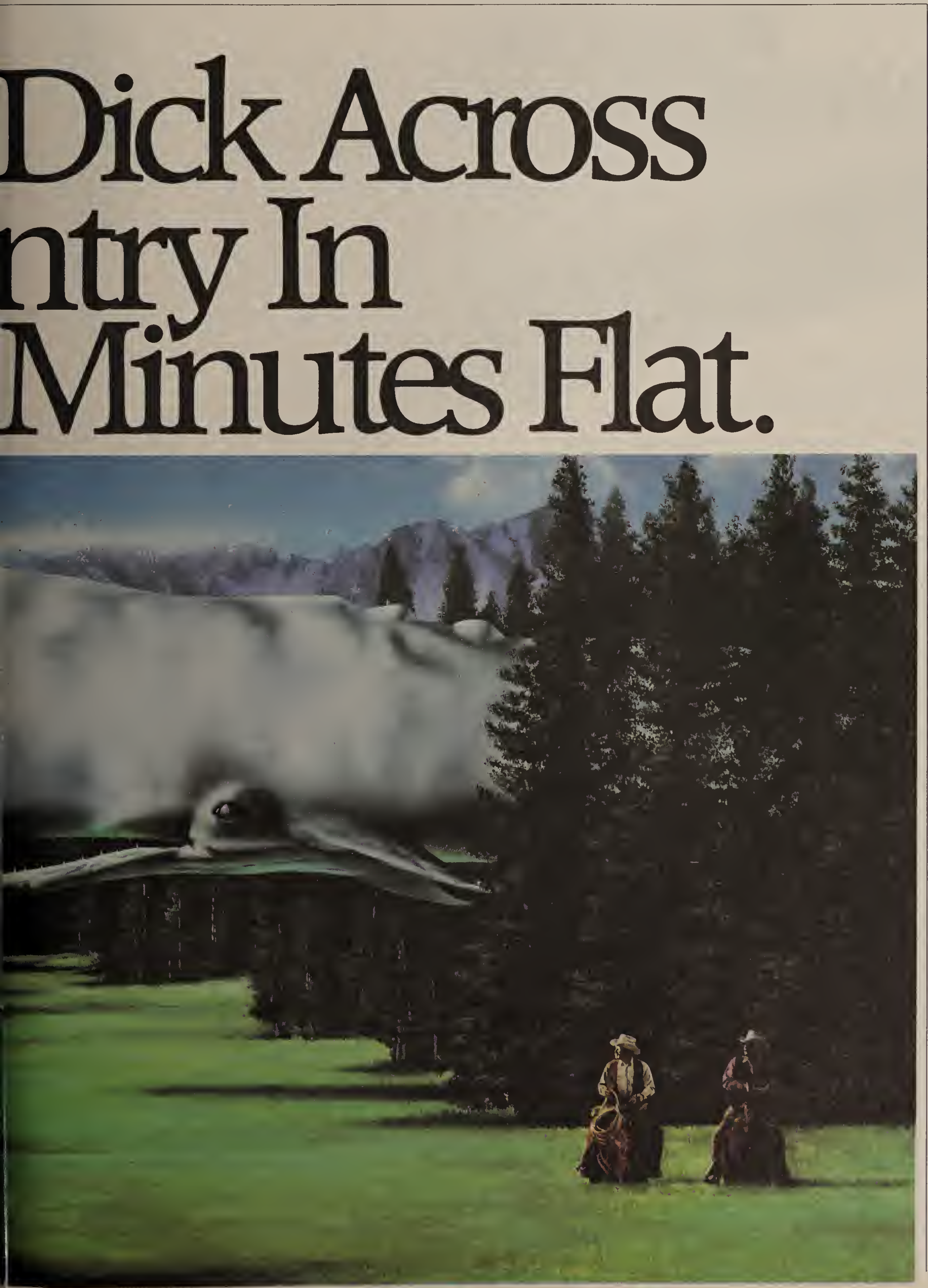
■

System/38 Assistants has announced **Catalog** and **SRCLST**, two utility commands for the IBM System/38.

Catalog allows the user to produce a report listing data files in a library.

The report prints file-size parameters, record capacity, current record count and index size.

Continued on page 131



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Stratus Computer Inc., Marlboro, MA 01752

NEW PRODUCTS/SOFTWARE & SERVICES

Continued from page 129

SRCLST reportedly allows the user to produce a listing of the Source Physical Files in a library and the content of each source file.

The commands cost $65 each, or $100 for both.

System/38 Assistants, P.O. Box 10237, Columbia, Mo. 65205.

■

Interactive Solutions, Inc. has released **CICS/Replay** for IBM CICS.

CICS/Replay is a logging facility that captures the I/O of a terminal and establishes a session library. This library, which allows users to browse, edit, copy and delete, is said to be used with all of the other components of the environment.

Features of CICS/Replay include direct replay, which is used for quality assurance, and regression testing. Volume replay is used to analyze response time and other performance-related functions.

CICS/Replay costs $18,000 for an operating system CPU license and $13,000 for DOS.

Interactive Solutions, 53 W. Fort Lee Road, Bogota, N.J. 07603.

■

Ivan-Bootsmith, a utility program, has been released by **Ivan Software, Inc.**

Ivan-Bootsmith is said to allow access to all NCR Corp. VRX operating system Edit Boot Files during the workday. It allows users to print the contents of any of the five Edit Boot Files or Last Boot, the file that stores the most recent system initialization statements.

Other features of Ivan-Bootsmith include the indexing of all Edit Boot Files, which can be printed on a single page. The contents of a single Edit Boot File can be copied into a control string file, and the contents of any Edit Boot File can be edited with any text editor, the vendor stated.

Ivan-Bootsmith runs on NCR computers operating under its VRX operating system and costs $800.

Ivan Software, 120 N. Keowee St., Dayton, Ohio 45402.

■

Orion Software, Inc. has released its **CMDSW36** software said to transmit IBM Displaywrite/36 documents to non-IBM networks.

The software also allows documents to be transmitted to local System/36 users as well as users on other System/34, 36 and 38 computers, whether domestic or international, the vendor said.

The CMDSW36 product ranges in price from $4,000 to $7,000.

Orion Software, 1050 Waltham St., Lexington, Mass. 02173.

■

Professional Computer Resources, Inc. has released **RMS Query Plus**, said to allow users access to the IBM System/38 data base without using menus.

With RMS Query Plus, reports, application files or on-line queries can be created or modified using command sentences, according to the vendor. RMS Query retrievals can be job-streamed without the need for operator intervention. It is said to be based on SQL principles and employs the native System/38 command processor, the vendor said.

RMS Query Plus costs $4,000.

Professional Computer Resources, Two Mid America Plaza, Oak Brook Terrace, Ill. 60181.

■

Sterling Software has enhanced its **Comparex** comparison utility.

Comparex is said to allow comparison of both data and text files of major data bases. It can also produce test files and highlight all expected and unexpected errors, according to the vendor. Comparex's interactive system productivity facility is said to provide on-line access to Comparex.

New features for the MVS environment allow for accurate reconciliation between loads. For DOS shops, new features include support of all DOS library structures and the ability to read the data directly from power queues.

Comparex costs $5,000 on DOS or MVS operating environments.

Sterling Software, Suite 100, 11050 White Rock Road, Rancho Cordova, Calif. 95670.

■

Uccel Corp. has announced the **Nova:Log Release 2.0** session management product.

Nova:Log is one of several foundation services that make up Uccel's Synova, a product that allows for customization and integration of software in the data center. Nova:Log reportedly allows users concurrent access to multiple applications.

New features include user profiling, which provides the user with a menu of important applications, and on-line administration, which provides the ability to maintain those users in an on-line, real-time mode, according to the vendor.

Nova:Log runs under XA or MVS SP 1.3 and above. A site license costs $24,000.

Uccel, Uccel Tower, Exchange Park, Dallas, Texas 75235.

Data base management systems

Marketing Information Systems has enhanced its **Marketing and Sales Management** (MSM) package for the Hewlett-Packard Co. HP 3000 system.

MSM is said to consist of a series of modules for building a sales and marketing data base.

The four modules include Lead Management, Mailing List Management, Prospect and Customer Management and Telemarketing Management System.

The MSM package costs from $10,000 to $18,000, depending on the combination of modules purchased, the vendor said.

Marketing Information Systems, 906 University Place, Evanston, Ill. 60201.

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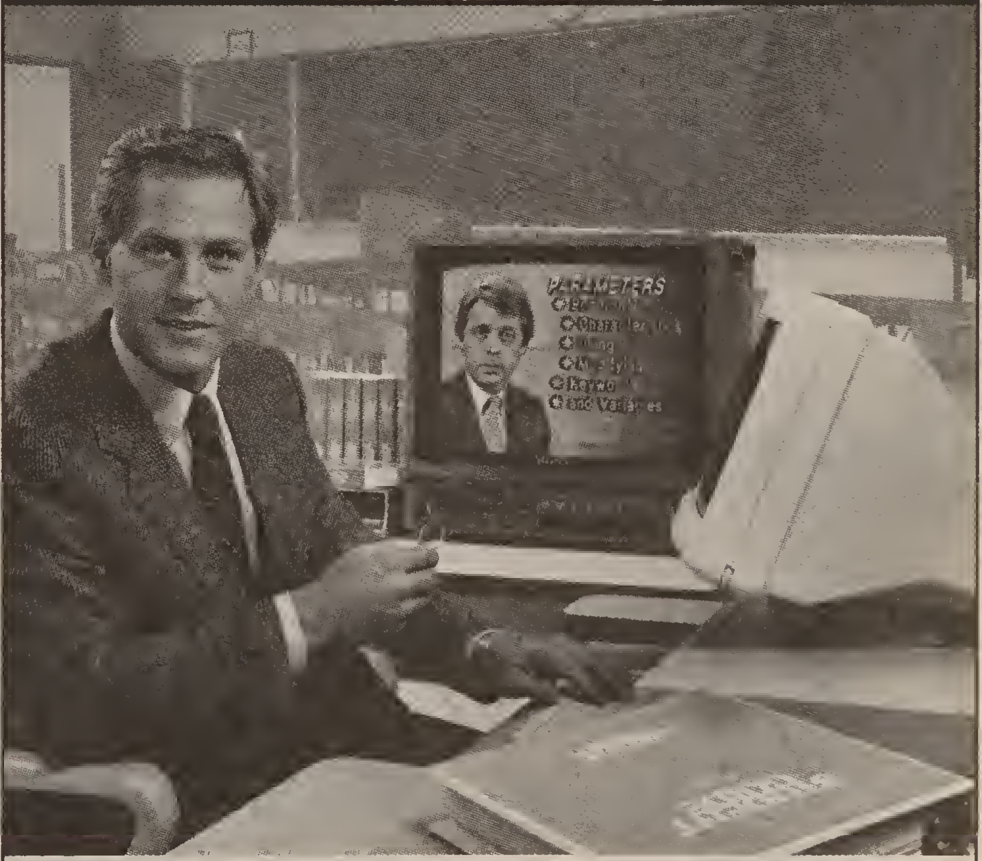

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NEW PRODUCTS/SOFTWARE & SERVICES

Datext, Inc. has announced **Release 1.1** of its **CD/Corporate** data base, available on compact disk/ read-only memory (CD-ROM) disks.

New features include an increase to seven years of historical financial information and customized reports that allow users to develop rankings of companies by industry and line of business; users may also use up to 57 criteria to custom-build a portfolio of companies. Other capabilities are said to include expanded portfolio features.

CD/Corporate is sold on an annual subscription basis with prices ranging from $9,600 for one optical disk of information to $19,600 for four disks. The price includes use of a CD-ROM disk drive.

Datext, 444 Washington St., Woburn, Mass. 01801.

■

Information Solutions, Inc. has announced **Less Than Truckload** (LTL), a fully integrated relational data base system.

Modules of LTL include freight billing, productivity analysis, customer routing, accounts receivable and payable, general ledger and financial reporting. Other modules are for interline settlements, local pickup and delivery and break bulk.

LTL runs on a number of computer systems, including IBM 4300- and 370-compatible systems, Digital Equipment Corp. and Honeywell, Inc. computers.

The software ranges in price from $29,500 to $200,000, depending on the hardware, according to the vendor.

Information Solutions, 6486 S. Quebec St., Englewood, Colo. 80111.

MICROCOMPUTERS

Systems

Bi-Tech Enterprises, Inc. has unveiled its **Long Island PC/AT**, said to provide full IBM Personal Computer AT compatibility.

Features of the Long Island PC/AT include 1M byte of main memory in addition to a 1.2M-byte, half-height, double-sided floppy disk drive. A hard-disk floppy controller with optional storage capacity of up to 140M bytes is included. Also included is 8 MHz of operational speed, along with a read-only memory BIOS, serial and parallel ports, built-in clock calendar, eight expansion slots, a high-resolution monochrome monitor in green or amber and an IBM PC AT-style keyboard.

The Long Island PC/AT costs $1,995.

Bi-Tech Enterprises, 10 Carlough Road, Bohemia, N.Y. 11716.

■

Concepts in Computer Technology, Inc. has unveiled **Cornerstone**, an IBM Personal Computer XT-compatible business computer.

The Cornerstone has 640K bytes of random-access memory, a 20M-byte fixed disk, a 20M-byte tape backup for archival data storage and a color monitor. Other features include high-integrity error correction and 750 bit/sec. data transfer support of DOS command execution.

Cornerstone is priced at $6,295, according to the vendor.

Concepts in Computer Technology, 450 E. Kennedy Blvd., Lakewood, N.J. 08701.

Software applications packages

Artech Software, Inc. has released **Freeform**, a graphics design system, and **Highlight**, a presentation graphics system for IBM Personal Computers.

Freeform is said to provide tools like interactive rotation sizing and color in two- or three-dimensional multiple fonts for text manipulation.

Highlight reportedly provides electronic slide shows and features pop-ups, wipes, scrolls and explodes, voice, music and animation.

Freeform costs $149.95, and Highlight costs $99.95.

Artech Software, P.O. Box 2847, Reston, Va. 22090.

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NEW PRODUCTS/MICROCOMPUTERS

Progressive Peripherals & Software, Inc. has released its **Add Graph** graphics package.

Add Graph offers 10 graph styles and 22 options and can display up to 30 windows at one time, according to the vendor. It also does graphs in two or three dimensions. Add Graph prints to laser printers, plotters, the Polaroid Corp. Palette and many ink-jet printers. It also supports most spreadsheets available for IBM Personal Computers and compatibles.

The Add Graph package is priced at $149.95, the vendor stated.

Progressive Peripherals & Software, 464 Kalamath St., Denver, Colo. 80204.

■

Progressive Peripherals & Software, Inc. has introduced **Logistix**, a spreadsheet-based integrated package.

Logistix reportedly incorporates project management, data base and graphics functions. It is said to use commands similar to those of Lotus Development Corp.'s 1-2-3 and is able to read Lotus and Ashton-Tate's Dbase files. Logistix gives the user access to more than 20 graphics formats, nine fonts and four windows. It also generates slides or transparencies of graphs. The package performs critical path analysis, arithmetic and logical operations.

Logistix is priced at $249.95.

Progressive Peripherals & Software, 464 Kalamath St., Denver, Colo. 80204.

■

KLS, Inc. has enhanced **Snap**, its sales territory management system.

The basic Snap files, including a client and prospect file, an activities and comments file and a tickler and contacts file, are now processed by a single program module. The call report now shows salesmen's activity and comments for the specified date range. The activity analysis is now said to provide more comprehensive activity recording codes, allowing for user-specified codes.

Snap requires at least 256K bytes of random-access memory and runs on Microsoft Corp. MS-DOS. It costs $4,500.

KLS, 862 Union St., Manchester, N.H. 03104.

■

Pinnacle Systems, Inc. has announced the availability of **Uniplex-II Plus**, an integrated office automation software system for its AT&T Unix-designed XL series of supermicrocomputers.

Uniplex-II Plus reportedly permits the free transfer of text, data and graphics between all functional product areas. Full function capability is provided in areas such as word processing, spreadsheet, data base management and electronic mail, the vendor said.

Uniplex-II Plus is priced at $1,495.

Pinnacle Systems, 10355 Brockwood Road, Dallas, Texas 75238.

■

Samna Corp. has ported its enhanced **Samna Word III** office automation software to Torus Systems, Inc. Tapestry networks.

Word III is a full-function word processing package that incorporates support for IBM's Document Content Architecture, spelling correction, automatic table of contents and index generation, line drawing, glossary and mail merge.

Enhancements allow users to start Word III directly from the applications menu with one keystroke and supports security measures of network operating software.

Samna Word III for Torus Tapestry local-area networks is priced from $1,250.

Samna, 2700 Northeast Expwy., Atlanta, Ga. 30345.

Software utilities

AT&T Information Systems has announced a version of Microsoft Corp.'s **Windows** software for its PC 6300 and 6300 Plus computers.

The company's version of Windows is said to support the 6300 and 6300 Plus's high-resolution graphics and the AT&T mouse. Both computers offer 640- by 640-pixel screen resolution. Desktop applications offered by Windows are said to include a calculator, calendar, clock, notepad, print spooler and terminal.

AT&T's Windows costs $99. Packaged with Microsoft's MS-DOS, the product costs $160.

AT&T, 100 Southgate, Morristown, N.J. 07960.

■

Business Tools, Inc. has released the **Developer's Version** of its **TAS-Plus** data base.

The new version includes Programmer's Toolkit, which includes 12 additional language commands and local-area network support. Source code to all utilities contained in the data base, such as the report writer, source code editor, screen painter and browse utilities, are also included.

The Developer's Version is priced at $199. It requires an IBM Personal Computer XT, PC AT or compatible running Microsoft Corp.'s MS-DOS 2.0 or higher, a monochrome or color monitor and 512K bytes of random-access memory.

Business Tools, 4038-B 128th Ave. S.E., Bellevue, Wash. 98006.

■

Keyword Office Technologies Ltd. has introduced **Keyword Softpak**, a software program that allows users to interchange documents created by different word processing programs.

*Source: International Data Corp. INFORMIX is a registered trademark of Informix Software, Inc. Other names indicated by TM are trademarks of their respective manufacturers. © 1986, Informix Software, Inc.

The software consists of two program diskettes. One diskette allows the transfer of documents from a source word processing system to a target word processing system. The other diskette lets users translate in the other direction. The original documents remain unaltered on the second disk.

Softpak runs on IBM Personal Computers, Personal Computer XTs, PC ATs or compatibles with 512K bytes of memory running Microsoft Corp.'s MS-DOS 2.0 or above. It costs $449.

Keyword Office Technologies, 2816 11th St. N.E., Calgary, Alberta, Canada T2E 7S7.

■

Sigma Software, Inc. has released a menu system, **Menu Plus+**, for the IBM Personal Computer XT, PC AT and compatibles.

Any software system can be run from Menu Plus+ because it is not batch-file dependent, the vendor said. It supports a main menu and 26 submenus, each with 26 options, the vendor added.

Menu Plus+ is priced at $39.95.

Sigma Software, 1009 Sullivan Ave., South Windsor, Conn. 06074.

■

Breakthrough Software Corp. has enhanced the utility for its **Time Line Export/Import** project manager for the IBM Personal Computer and compatibles.

Time Line contains project management features such as resource leveling, partial resources allocation and lead and lag scheduling for planning and control of time and costs.

The utility allows for a direct export and import interface with Lotus Development Corp.'s 1-2-3 and Symphony, Ashton-Tate's Dbase II and III and other software products.

Time Line costs $495 and includes the utility.

Breakthrough Software, 505 San Marin Drive, Novato, Calif. 94947.

■

Ideassociates, Inc. has introduced **Ideacomm 3287**, a printer emulator that allows personal computer printers to emulate the IBM 3287 mainframe printer.

Ideacomm 3287 works with the company's 3278 terminal emulation board to emulate a mainframe system printer. The software-driven printer control panel reportedly duplicates all the features of the 3287 printer, including the number of lines per inch, test, error code, spacing and reset. A hot-key capability allows users to continue with a DOS application while printer emulation runs in the background, the vendor said.

The Ideacomm 3287 costs $795, including coaxial board and printer emulation software.

Ideassociates, 29 Dunham Road, Billerica, Mass. 01821.

■

Venturcom, Inc. has announced its **Venix E-Net 205** software.

Venix E-Net reportedly allows IBM Personal Computers, Personal Computer XTs, PC ATs and compatibles running Venturcom's Venix System V operating system to be linked to Digital Equipment Corp. VAX computers and other hardware connected via an Ethernet local-area network using the Transmission Control Protocol/Internet Protocol.

E-Net also allows users to build applications using process-to-process communications, resulting in a seamless integration of programs between VAX and PC environments.

Venix E-Net 205 costs $595.

Venturcom, 215 First St., Cambridge, Mass. 02142.

Software data base management systems

Sterling Software, Inc. has released its **Intelligent Backup DMS/PC**, a data management package for IBM Personal Computers and compatibles.

Intelligent Backup reportedly allows a PC user to back up a disk by keeping track of what actually needs backing up. It prompts the user to perform backup and is able to recognize which files are never changed and only backs up those files once.

It also performs disk data management and is compatible with IBM PC-DOS and local-area networks, the vendor said.

Intelligent Backup costs $149.95.

Sterling Software, Software Laboratories Division, Suite 280, 202 E. Airport Drive, San Bernadino, Calif. 92408.

Software enhancements

Financial Decision Systems, Inc. has released **Micro Corptax Version 3.4**, designed for corporate income tax preparation and planning.

Micro Corptax reportedly allows the merging of text and graphics for data entry and printing. Version 3.4 allows the system to be run using a standard IBM Color Card or a Hercules Computer Technology, Inc. Monochrome Graphics Card. The Federal Form 1120 and support schedules, as well as state income and franchise tax returns and extensions, are supported.

Micro Corptax Version 3.4 operates on the IBM Personal Computer, Personal Computer XT, AT and some compatibles. It requires 640K bytes of random-access memory and a printer. Micro Corptax Version 3.4 costs from $3,500.

Financial Decision Systems, Suite 1000, 28035 Dorothy Drive, Agoura Hills, Calif. 91301.

■

Version 2.0 of **Statgraphics**, a sta-

Continued on page 136

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Continued from page 135

tistical graphics software package for microcomputers, has been released by **STSC, Inc.**

Statgraphics reportedly offers more than 250 functions for interactive data analysis and data management.

Features of Version 2.0 include enhancements to the data management facilities, including automatic creation of data directories; general increases in speed throughout the system; new procedures such as stem and leaf displays, U-charts and analysis of covariance; and enhanced graphics options.

Statgraphics Version 2.0 costs $795. It runs on the IBM Personal Computer, Personal Computer XT, AT and compatibles.

STSC, 2115 E. Jefferson St., Rockville, Md. 20852.

Wordperfect Corp. has released **Wordperfect 1.1** for Apple computer, Inc.'s Apple IIe and Apple IIc computers.

Wordperfect 1.1 features include increased overall speed of the program, an install program said to take advantage of expanded memory and other Pro-DOS-compatible hardware.

Also included is a 50,000-word speller that checks a single word, page or document and then helps the user locate the correct spelling by displaying lists of possible spellings to choose from.

Wordperfect 1.1 also offers support for true proportional printing for both hardware monitor interface and microspacing printers, according to the vendor.

Wordperfect 1.1 is priced at $179.

Wordperfect, 288 W. Center St., Orem, Utah 84057.

Skok Systems, Inc. has added five enhancements to **Drawbase**, its integrated computer-aided design, drawing and data management software program.

Drawbase features now include electrostatic plotting support; background plotting; interface to Autodesk, Inc.'s Autocad; interface to Mega Cadd, Inc.'s Design Board 3-D; and interface to Resource Dynamics, Inc.'s RDI/PC, a facilities management package.

According to the vendor, users can now transfer any DXF format drawing created using Autocad or drawing files from Design Board 3-D to Drawbase.

The enhanced version of Skok Systems' Drawbase software is priced at $4,995.

Skok Systems, 222 Third St., Cambridge, Mass. 02142.

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Diagonal Data Corp. has enhanced its **Micro Maint** maintenance scheduling and reporting software.

New features include an enhanced forecasting capability that allows maintenance forecasting by week, month, skill or equipment, as well as reports on manpower availability that take maintenance requirements and vacation schedules into account. Included with Micro Maint are a work schedule backlog, maintenance parts inventory, purchase order tracking and management reporting.

Micro Maint runs on most personal computers and some minicomputers.

The product is priced at $4,950.

Diagonal Data, 2000 E. Edgewood Drive, Lakeland, Fla. 33803.

■

E-Z Gen, Inc. has released **Version 1.1** of **E-Z Cob**.

E-Z Cob is a programmer productivity tool said to be capable of generating Cobol language programs for use on personal computers as well as code generation and prototyping of host on-line systems on the PC. Version 1.1 enhancements include array generation for repeating rows of screen variables, horizontal and vertical rolling menus and improved runtime dynamic control of screen manipulation.

It features a full-screen painting facility that supports both monochrome and color monitors, reusable code library, user exits and context-sensitive Help and tutorials.

E-Z Cob is priced at $495.

E-Z Gen, 1019 Mount Pleasant Way, Cherry Hill, N.J.

■

Release 2.0 of **Logger** has been released by **System Automation Software, Inc.**

Logger is a computer resource monitor that tracks the daily use of IBM Personal Computers, Personal Computer XTs, ATs and compatibles. Release 2.0 allows users to choose from a number of summary reports and provides login security. Reports include user name, date, time in and time out and directory name.

Logger is priced at $74.95.

System Automation Software, 8555 16th St., Silver Spring, Md. 20910.

■

Micro-MRP, Inc. has released **Version 4.0** of its **Max MRP II** manufacturing and financial control system for IBM microcomputers.

Features of Version 4.0 reportedly include expanded purchasing capabilities, short user learning times, better labor cost control and reporting mechanisms for shop floor operations, reduced shop floor paperwork and improved flow of components to manufacturing.

The system ranges in price from $2,000 to $23,000, depending on configuration.

Micro-MRP, 1065 E. Hillsdale Blvd., Foster City, Calif. 94404.

Communications

SST Data, Inc. has announced **Handshake Colt**, a computer-linked telex for the AT&T Unix PC Model 7300.

Handshake Colt, which is compatible with the microcomputer's inter-

Continued on page 138

The computer below gives you $6000 performance.

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NEW PRODUCTS/MICROCOMPUTERS

Continued from page 136

nal modem, offers access to Western Union Corp.'s Easylink network. All messaging is done in background mode, allowing operators to use the system for other applications without interruption. Operators can create messages any time, specifying date and time to be sent.

An on-line data base maintains a directory of company names, telex/ Easylink numbers, answerbacks and business addresses. Users can also select a text editor.

Handshake Colt costs $495 for the Unix PC version.

SST Data, Suite 100, 4701 W. Schroeder Drive, Milwaukee, Wis. 53223.

Data storage

Design Software has released **Version 2.4** of its **DSBackup** host utility software.

With DSBackup Version 2.4, Microsoft Corp. MS-DOS and IBM PC-DOS users are able to back up single files, single directories, multiple directories or an entire hard disk drive. Version 2.4 features include automatic estimation of diskettes required for backup, backup to any logical device and backup files larger than one floppy disk.

DSbackup costs $69.95 for the IBM Personal Computer and non-IBM PC-compatible Microsoft MS-DOS versions. It costs $99.95 for the Apple Computer Inc.'s Macintosh and Macintosh Plus versions.

Design Software, 1275 W. Roosevelt Road, Chicago, Ill. 60185.

Data Technology Corp. has announced a **disk drive** for personal computers.

The drive features a 10M-byte removable media cartridge in a 5¼-in. format, according to the vendor. The data transfer rate from the disk is said to be 275K bit/sec. and is enhanced by a 64K-byte random-access memory buffer.

A single half-high drive subsystem costs $1,995; with a dual configuration it costs $1,995, according to the vendor. Media costs $39 per diskette cartridge.

Data Technology, 2775 Northwestern Pkwy., Santa Clara, Calif. 95051.

Printers/Plotters/Peripherals

IBM has introduced **Infowindow Display**, said to be capable of combining audio, video, computer graphics and text in a coordinated and interactive manner.

Infowindow Display has a single 13-in., dual-frequency display screen that is attachable to the IBM Personal Computer, Personal Computer XT and AT.

Features include choice of 16 colors, touch-sensitive display, integrated stereo speakers, dual-frequency graphics and support for attachment of up to two non-IBM videodisk players.

The Infowindow display is priced at $4,195 and will be available in the fourth quarter.

IBM, North-Central Marketing Division, 1133 Westchester Ave., White Plains, N.Y. 10604.

Percon, Inc. has announced **E-Z-Reader**, a bar code reader for AT&T Personal Computer 6300 and 6300 Plus.

E-Z-Reader features a decoding algorithm that decodes both dot matrix and preprinted labels. It plugs in between the keyboard and the computer and is said to be compatible with any software currently used that expects keyboard input, including Lotus Development Corp.'s 1-2-3 and Ashton-Tate's Dbase III Plus. E-Z-Reader also works with Olivetti Corp. M24 and Xerox Corp. 6064 and 6065 models of computers.

E-Z-Reader with high-grade sealed-tip metal wand costs $635.

Percon, 2190 W. 11th Ave., Eugene, Ore. 97402.

■

CPT Corp. has introduced its **CPT LP-6** desktop laser printer said to be compatible with most IBM Personal Computer software.

The LP-6 reportedly allows printing of text and graphics from PC software and printing of text from CPT's Phoenix and Phonenix Jr workstations. The printer features nine built-in fonts and provides letter-quality printing at up to eight page/min.

The LP-6 is said to enable printing on nonconventional paper stock, envelopes, transparencies and labels. Options for the LP-6 include a dual-tray sheet and envelope feeder, legal-size paper tray, paper stacker and additional fonts that can be downloaded.

The CPT LP-6 printer costs $2,500.

CPT, P.O. Box 295, 8100 Mitchell Road, Minneapolis, Minn. 55440.

■

SWFTE International, Ltd. has introduced **Laserware**, a memory-resident publishing program for the Hewlett-Packard Co. Laserjet printer.

Laserware reportedly combines typesetting commands, text and graphics integration and forms management in a single package. Typesetting capabilities include font changes, centering justification and decimal tabs.

The program features functions to capture graphics plots as they are printed or to save images directly from the screen. Forms management features include line and box drawing, shading and data integration. Laserware also has an algorithm to optimize use of the Laserjet printer memory.

Laserware runs on an IBM Personal Computer or compatible.

Laserware costs $99.95.

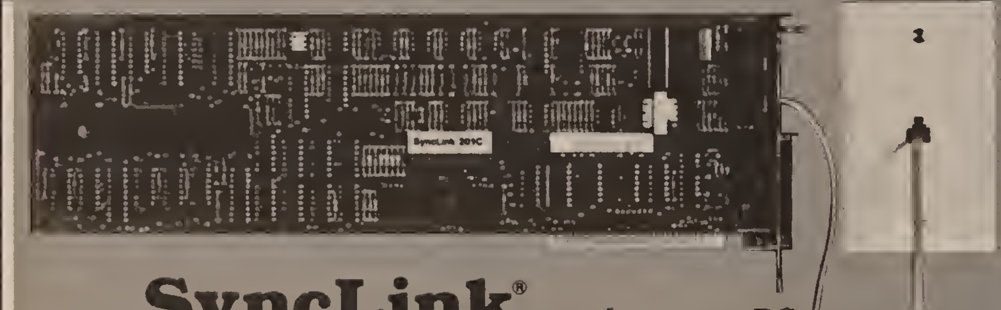
SWFTE International, P.O. Box 219, Rockland, Del. 19732.

■

Support Systems International Corp. has introduced the **Multiswitch** printer sharing device, said to allow up to four IBM Personal Computers or compatibles to share one parallel printer.

Multiswitch is said to automatically lock onto whichever PC needs the

Continued on page 140



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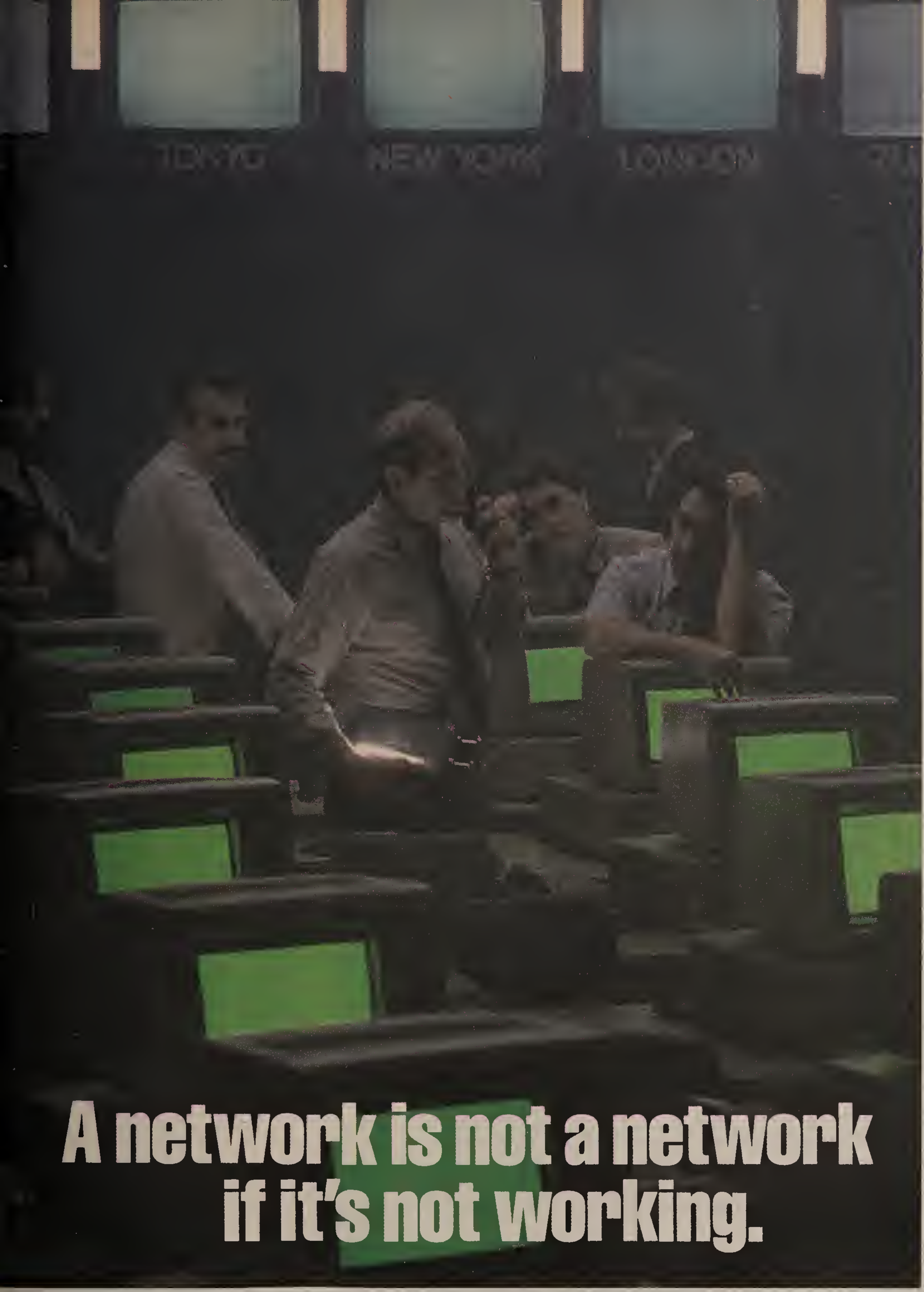
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Continued from page 138

printer as if the printer were completely dedicated to one user. No software commands or manual switching are required. According to the vendor, internal line drivers boost the signals so that the printer can be at least 100 feet from the PC. Each time the unit is turned on it goes through a full self-test to ensure proper operation.

Multiswitch costs $495.

Support Systems International, 150 S. Second St., Richmond, Calif. 94804.

■

Toshiba America, Inc. has introduced the **Pagelaser 12** laser printer.

The Pagelaser 12 reportedly prints at a rate of 12 page/min and offers high-resolution text at 300 by 300 dot/in. Standard with the Pagelaser 12 are a parallel serial interface; 512K bytes of memory; three standard resident fonts (prestige elite, courier and draft); three font-cartridge slots; and two downloadable fonts.

The printer comes with a 250-sheet input bin, a correct order stacking output bin that holds 250 sheets and a manual single-sheet feeder.

The Pagelaser 12 has resident emulation of the IBM Graphics Printer and Diablo Systems, Inc. 630.

The Pagelaser 12 costs $3,499.

Toshiba America, 2441 Michelle Drive, Tustin, Calif. 92680.

■

Olympia USA, Inc. has introduced its **Olympia NP 80** and **NP 136** dot matrix printers.

The NP 80 is an 80-col. dot matrix printer with a 200 char./sec. print speed in draft mode and 40 char./sec. in near-letter-quality mode. It has a 10-in. paper width, features four push button-selectable print pitches and offers print enhancements such as bold and italic printing. There are eight resident international character sets as well as download capability for 95 characters.

The NP 80 also has a 7,000-char. buffer and a built-in forms tractor. The NP 136 has all the features of the NP 80 plus a 136-col. print line and 16-in. paper width.

The NP 80 costs $549 and the NP 136 costs $699.

Olympia USA, Box 22, Somerville, N.J. 08876.

■

Dynax, Inc. has introduced its **Fortis DM2010** and **DM2015** dot matrix printers.

Both the Fortis DM2010 and DM2015 are said to print 200 char./sec. in draft mode and 50 char./sec. in near-letter-quality mode. Features of both printers include built-in tractor feed and a 7K-byte buffer expandable to 15K bytes. The Fortis DM2010 and DM2015 both feature interchangeable font cards, according to the vendor.

The DM2010 costs $459, and the DM2015 costs $559.

Dynax, 6070 Rickenbacker Road, Commerce, Calif. 90040.

■

Conrac Division has introduced its **Model 7064** color monitor.

The Model 7064 is a 14-in., red-green-blue color monitor said to be compatible with both the IBM Enhanced Graphics Adapter (EGA) card and the IBM Color Graphics Adapter (CGA) card. It allows user selection of medium- or low-resolution graphics modes. Utilizing the EGA card, the monitor can display up to 16 colors out of a palette of 64 colors and provides a resolution of 640- by 350-pixels. With the CGA, it displays 16 colors and has a resoltuion of 640- by 200-pixels. The monitor can also be switched to text mode.

The Model 7604 costs $735.

Conrac Division, 600 North Rimsdale Ave., Covina, Calif. 91722.

■

Printronix, Inc. has unveiled its IBM-compatible personal line printer, called the **P1013.**

The printer reportedly features an ultrasmall print tip that produces letter-quality text and graphics. Text printing in draft mode is at 134 line/min., and in letter-quality mode, it operates at 47 line/min., according to the vendor. IBM Block Graphics can be printed in either draft- or letter-quality mode.

The printer's plug-in cartridges are said to allow it to emulate IBM's Proprinter or Epson America, Inc.'s LQ1500.

The P1013 is available now for $795.

Printronix, P.O. Box 19559, 17500 Cartwright Road, Irvine, Calif. 92713.

Board-level devices

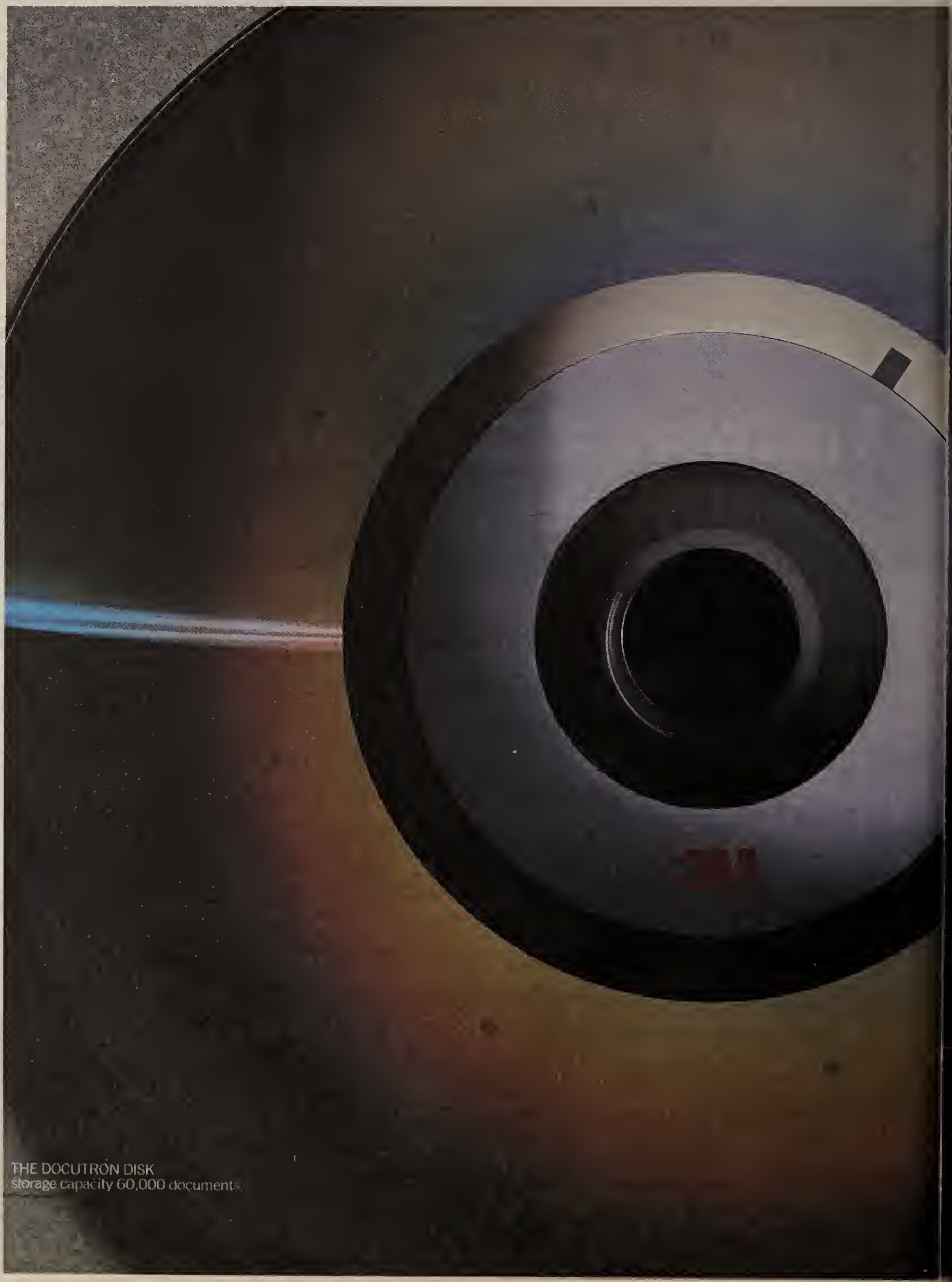
Definicom Systems, Inc. has introduced its **MMM graphics processor board** family for IBM-compatible personal computers.

The three-board family is made up of two computing engines, the DSI-70 and the DSI-020 as well as a graphics processor. Both engine boards reportedly can be set at clock rates up to 20 MHz. Communication channels are implemented via dual RS-232C ports and DB-9 and DB-25 connectors. Both boards also feature signature-matching capabilities to prevent copying of valuable object code.

A major feature of the MMM graphics processor board is its programmability for pixel configuration with aspect ratios to 1,280 by 960 and speeds to 50 MHz as required.

The DSI-020 costs $1,994; the DSI-780 costs $3,295; and the graphics processor board is $1,495.

Definicom Systems, Suite 108, 31324 Via Colinas, Westlake Village, Calif. 91362.



Alps America has introduced **Imagenhancer**, a controller board said to aid in the production of high-resolution graphics on dot matrix printers.

The Imagenhancer graphics board enables a printer to accept Houston Instrument Co. DM/PL plotter commands. Imagenhancer features a 512K-byte memory buffer that frees the host CPU for other tasks while graphics output is being produced.

The board enables both graphics and letter-quality text to be printed on the same page, the vendor stated.

Imagenhancer fits into the expansion slot of an IBM Personal Computer or compatible. It will drive the Alps P2000 printer and compatible nine-pin dot matrix printers.

Imagenhancer costs $595.

Alps America, 3553 N. First St., San Jose, Calif. 95134.

Microsync, Inc. has announced **The Screamer**, a speed-up board for the IBM Personal Computer, Personal Computer XT and compatibles.

The Screamer board reportedly monitors the task that the computer is performing and doubles the speed of computer operations, including processing, I/O and direct memory access.

The Screamer comes with a clock/calendar backed up by an on-board battery and keyboard-selectable speed control.

It fits into a short or standard expansion slot.

The speed-up board requires at least one 360K-byte disk drive and is compatible with other expansion boards.

The Screamer costs $199.

Microsync, P.O. Box 116302, Carrollton, Texas, 75011.

Auxiliary equipment

Formaster Corp. has introduced the **Master Control Unit** (MCU) and the **QA board** for its Series One Diskette Duplication System.

The MCU is a combination of software and circuit board hardware said to permit any Formaster Series One control cabinet to communicate with an IBM Personal Computer, Personal Computer XT or compatible cabinet. It can also specify program formats and the quantity of each type of diskette to be duplicated.

The QA board is said to offer simultaneous certification and duplication to Series One customers. The QA board certifies diskettes by testing a random signal generated by real data on the media, the vendor stated.

Both the QA board and the MCU are optional with the Series One Duplication System. The MCU costs $10,000, and the QA board costs $3,995.

Formaster, 2190 Bering Drive., San Jose, Calif. 95131.

■

Topaz, Inc. has introduced the **Power Director**, a multiple-outlet power control center.

The Power Director is said to protect personal computer systems against voltage spikes, power surges, electromagnetic interference and radio frequency interference.

Power director features outlets for up to five computer system components. According to the vendor, each device can be powered up independently, using individual switches, or the master switch can be used to power up the entire system at once. The Power Director reportedly prevents surges from reaching a computer through the modem.

Prices for the Power Director, which is available in three styles, start at $195.95.

Topaz, 9192 Topaz Way, San Diego, Calif. 92123.

COMMUNICATIONS

Controllers

Fibercom, Inc. has introduced the **Whisperlan/VME** fiber-optic communications card.

Whisperlan/VME is a fiber-optic Ethernet transceiver and a fiber-optic RS-232C modem card that plugs into a VME card cage, allowing users to combine computing with distance capability, according to the vendor. The card works with Fibercom's Whispernet, a fiber-optic, Ethernet local-area network.

Available now, the Whisperlan/VME card is priced at $4,000, the vendor said.

Fibercom, P.O. Box 11966, Roanoke, Va. 24022.

■

Network Equipment Technologies Co. has added the **IDNX/70** to its family of T1 switches with built-in network management.

The switch is said to support up to 96 T1 lines and to include nonvolatile random-access memory chips that preserve the system software in the event of a power failure.

The IDNX/70 is compatible with all existing IDNX models. The IDNX/60 can be upgraded to become an IDNX/70.

The switch is available with or without a redundant processor, memory, clock and switch. The IDNX/70 costs $55,200, and the IDNX/60 costs $33,500.

Network Equipment Technologies, 400 Penobscot Drive, Redwood City, Calif. 94063.

Protocol converters

May-Craft Information Systems, Inc. has announced a line of protocol converters.

The converters are available in three-, five-, seven- or nine-port units and have dual-host access. The 74R has addressable printer ports and emulates the IBM 3274 or 3276 control units. It is priced from $3,000 to $6,000. The 3780 is a bisynchronous communications converter that emu-

Continued on page 142

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3M Center, Bldg. 216-2N, St. Paul, MN 55144

3M

Continued from page 141

lates IBM 3780, 2780, 2770 and 3741 and allows transfer of data at rates up to 19.2K bit/sec. It costs $1,445.

The 87P allows an ASCII printer to be attached to an IBM 3274, 3276 or 4701 control unit via the IBM Type A device adapter. It costs $1,495. The 78T is a stand-alone converter that allows ASCII CRTs and personal computers to attach to 3274 and 3276 controllers. It costs $995.

May-Craft Information Systems, 4312 Beltwood Pkwy. S., Dallas, Texas 75244.

◆

Astrocom Corp. has added the **ATS-1 Asynch to Synch Converter** to its family of data communications products.

The ATS-1 is said to accept ASCII data from an asynchronous device and convert it for operation with synchronous transmission devices. Features include autospeed adjustment to support data rates from 12K bit/sec. to 19.2K bit/sec. and 5- to 10-bit data character sizes, a 64-bit buffer and front-panel LEDs.

The ATS-1 is priced at $495.

Astrocom, 120 W. Plato Blvd., St. Paul, Minn. 55107.

Software

S&H Computer Systems, Inc. has announced **Messagenet**, an electronic mail management system for Digital Equipment Corp. VAX computers.

Messagenet automatically manages the routing, transmission, reception and filing of electronic mail messages and data. It allows users to send telexes, mailgrams and cablegrams through MCI Communications Corp.'s MCI Mail and Western Union Corp.'s Easylink and allows direct transfer of messages and files over phone lines to other computers with Messagenet, the vendor said.

Messagenet for VAX starts at $2,000.

S&H Computer Systems, 1027 17th Ave. S., Nashville, Tenn. 37212.

Multiplexers/Modems

Data Race, Inc. has introduced its **Race-BMX** high-speed, dial-up modem.

Race-BMX is said to allow block-mode asynchronous ASCII terminals or personal computers to operate over dial-up telephone lines at speeds up to 19.2K bit/sec. It works on standard dial-up telephone circuits or on two-wire, voice-graded lease lines.

Race-BMX offers autodialing, automatic hang-up after a preset duration of no activity and automatic redial.

The Race-BMX costs $1,195.

Data Race, Suite 108, 12758 Cimarron Path, San Antonio, Texas 78249.

Local-area networks

Standard Microsystems Corp. has introduced the eight-port **Active Hub-Opt**, designed for mixed Datapoint Corp. Arcnet networks that use the vendor's Arcnet PC300, PC200 or PC100 controller boards.

The Active Hub-Opt features four fiber-optic and four coaxial I/O ports. According to the vendor, the product provides signal regeneration to maintain data integrity.

The Active Hub-Opt is priced at $4,895.

Standard Microsystems, 35 Marcus Blvd., Hauppauge, N.Y. 11788.

◆

David Systems, Inc. has enhanced its **David Information Manager** voice local-area network with a distributed data networking feature.

The added feature is said to allow users to connect multiple David Information Managers into a single network via fiber-optic cabling for up to 1.5 miles or into T1 links for up to 2,000 miles. According to the vendor, the feature allows users to transmit RS-232 and Ethernet data simultaneously over a common medium.

Circuit cards equipped for fiber-optic cable cost $4,490; equipped for T1 networking, they cost $6,150.

David Systems, 701 E. Evelyn Ave., Sunnyvale, Calif. 94086.

Network services

Wang Laboratories, Inc. has announced the availability of **Executive Service** and **VS Market Link**, parts of The Shark services, on Wang VS computer systems.

Executive Service allows users to access real-time quotes and market monitors from the North American stock exchanges. Users can also access news service retrieval capabilities and use Wang Information Management software.

Executive Service on the VS costs $300 per month for a three-user dial-up service including software and a modem. A one-time license fee of $1,000 for dial-up service and $2,500 for leased-line service is also required.

VS Market Link provides an interface for user-developed applications requiring market data. VS Market link costs $150 per port on Wang VS and requires dial-up or leased-line service.

Wang Laboratories, One Industrial Ave., Lowell, Mass. 01851.

Test equipment

Hewlett-Packard Co. has introduced its **HP 4951C** disk-based portable protocol analyzer.

The HP 4951C is for the installation, maintenance and design of data communication networks of up to 19.2K bit/sec., according to the vendor. It includes a microfloppy disk drive and file management for access to stored data and programs.

Software available for the HP 4951C reportedly allows off-line testing of IBM 3270-compatible terminals. It includes tests that verify the

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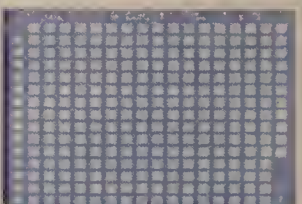

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Which means you've got your data in all the right places. And the right hands.

configuration of the protocol, data code, address and mode as well as the functions of the display, keyboard and printer.

The HP 4951C with microfloppy disk drive and RS-232C and V.24 interface costs $4,000.

Hewlett-Packard, Inquiries Manager, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

Auxiliary equipment

Applied Concepts, Inc. has introduced a line of **SBX multimodules** with fiber-optic interfaces.

The SBX modules can be installed on Intel Corp.'s Multibus I or Multibus II and most VME single-board computers to provide additional I/O capability.

According to the vendor, by using fiber optics as the communications link, higher data rates can be transmitted over greater distances than with copper wire. The fiber-optic interface is also said to have a low bit-error rate.

The SBX multimodules are priced from $350, depending on module and connector type.

Applied Concepts, Suite 1200, 8950 Villa La Jolla Drive, La Jolla, Calif. 92037.

■

Dynapac has released the **Crypto-PAD X.25** for data encryption for packet-switched networks.

The Crypto-PAD X.25 packet assembler/disassembler, using the National Bureau of Standards' Data Encryption Standard algorithm, encrypts data before it is placed into data packets and decrypts it before sending it to the host or terminal, the vendor said.

The unit is said to allow connection of any asynchronous data terminal and provides all features of a standard Level III packet assembler/disassembler.

Crypto-PAD X.25 costs $1,895.

Dynapac, 6464 General Green Way, Alexandria, Va. 22312.

SYSTEMS & PERIPHERALS

Processors

Sigma Information Systems has introduced the **SIS-ICM-3216-BSP** and the **SIS-ICM-3216-EXP**, packaged systems supporting National Semiconductor Corp.'s ICM-3216 Integrated Computer Module.

The basic package, the SIS-ICM-3216-BSP, includes 4M bytes of random-access memory (RAM), a 40M-byte Winchester disk drive and a 60M-byte streaming cartridge tape drive. The price is $8,897, including AT&T's Unix System V.

The enhanced performance package, the SIS-ICM-3216-EXP, is said to include 8M bytes of RAM, a 160M-byte Winchester disk and a 60M-byte streaming cartridge tape drive. The price of the package is $13,685.

Sigma Information Systems, Suite 200, 3031 Tisch Way, San Jose, Calif. 95128.

■

MRI Computers has introduced the **Unibus Segment Isolator/High Speed Repeater** (USI/HSR), a twin dual module said to replace the Digital Equipment Corp. M920 or M9202 Unibus connector.

The USI/HSR can double or triple Unibus load capacity without adding a second or third Unibus adapter on VAX systems, the vendor said.

The USI/HSR costs $3,000.

MRI Computers, Suite 209, 7310 W. McNab Road, Fort Lauderdale, Fla. 33319.

■

Concurrent Computer Corp. has announced the **Mil-STD-1553 bus interface** for use with its Series 3200 supermicrocomputers.

The single-unit bus interface serves as a bus controller, bus monitor and emulator of up to 32 remote terminals, according to the vendor. Its preprogrammed features allow software selection of terminal characteristics and data transfer features.

It consists of a rack-mounted chassis unit and a Motorola, Inc. VMEbus interface. The full-function Mil-STD-1553, which is available on all Series 3200 supermicrocomputers except the 3203 and 3205 processors, is priced from $65,000.

Concurrent Computer, 197 Hance Ave., Tinton Falls, N.J. 07724.

■

Distributed Logic Corp. has announced its **MQ-100** multipurpose circuit board, said to facilitate configuration of Q-bus systems.

The MQ-100 is a single, dual-height add-on module that includes a system console port, on-board self-test diagnostics, a line time clock, back-plane DC voltage monitors and power up/power down sequencing circuits.

It also includes on-board, bootstrap support for a variety of floppy disks, hard disks and tape drives and on-board diagnostic, programmable read-only memory for CPU, peripheral and memory troubleshooting and Q-bus terminators.

The MQ-100 board costs $900.

Distributed Logic, P.O. Box 6270, 1555 S. Sinclair St., Anaheim, Calif. 92806.

Plessey Microsystems, Inc. has unveiled the **PME 68-12**, a Motorola, Inc. VMEbus-compatible single-board computer.

The PME 68-12 comes with up to 4M bytes of on-board, dual-ported dynamic random-access memory, and it has a high-speed, asynchronous local bus that helps reduce bus loading,

Continued on page 146

Without a lot of hands-on training. In fact, it's easier to operate than an impact printer. So it doesn't require much attention. Or any chemicals. Our advanced dry image technology just gives you clean, high-quality data.

For more input on how the COM Print 6000 can improve your output, call toll free: (800) 556-1234 ext. 218. In California, call (800) 441-2345 ext. 218.

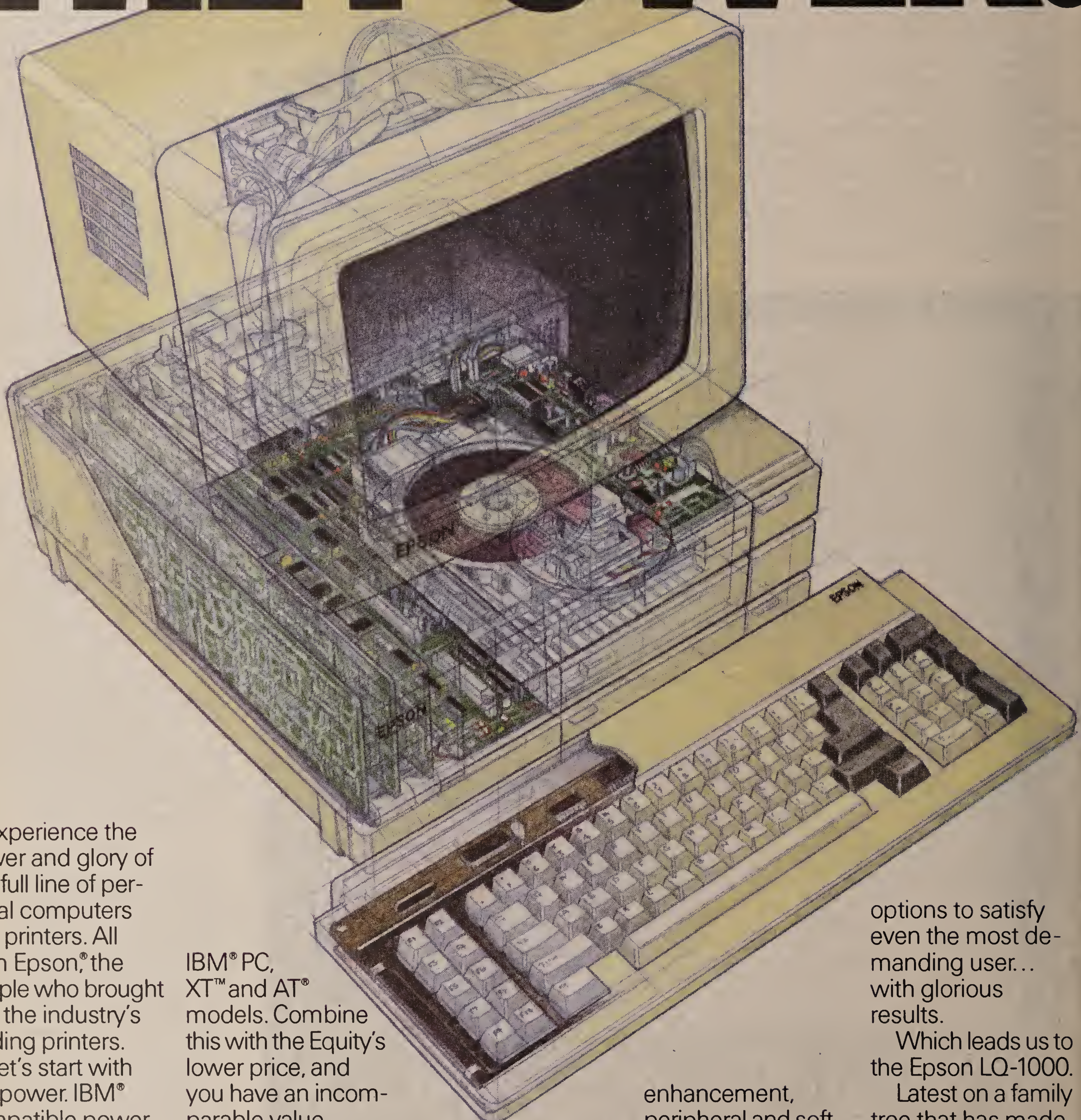
It's the small COM System that replaces a service bureau. And that could mean a big difference in your budget.

BELL+HOWELL
COM Division

16691 Hale Avenue, Irvine, CA 92714-5047

Bell + Howell and COM Print 6000 are trademarks of Bell & Howell Company.

THE POWER.



Experience the power and glory of this full line of personal computers and printers. All from Epson,® the people who brought you the industry's leading printers.

Let's start with the power. IBM® compatible power.

Epson delivers it three ways: Equity™ I, Equity™ II and Equity™ III. These three computers offer equal or better performance and more standard features than the corresponding IBM® PC, XT™ and AT® models. Combine this with the Equity's lower price, and you have an incomparable value.

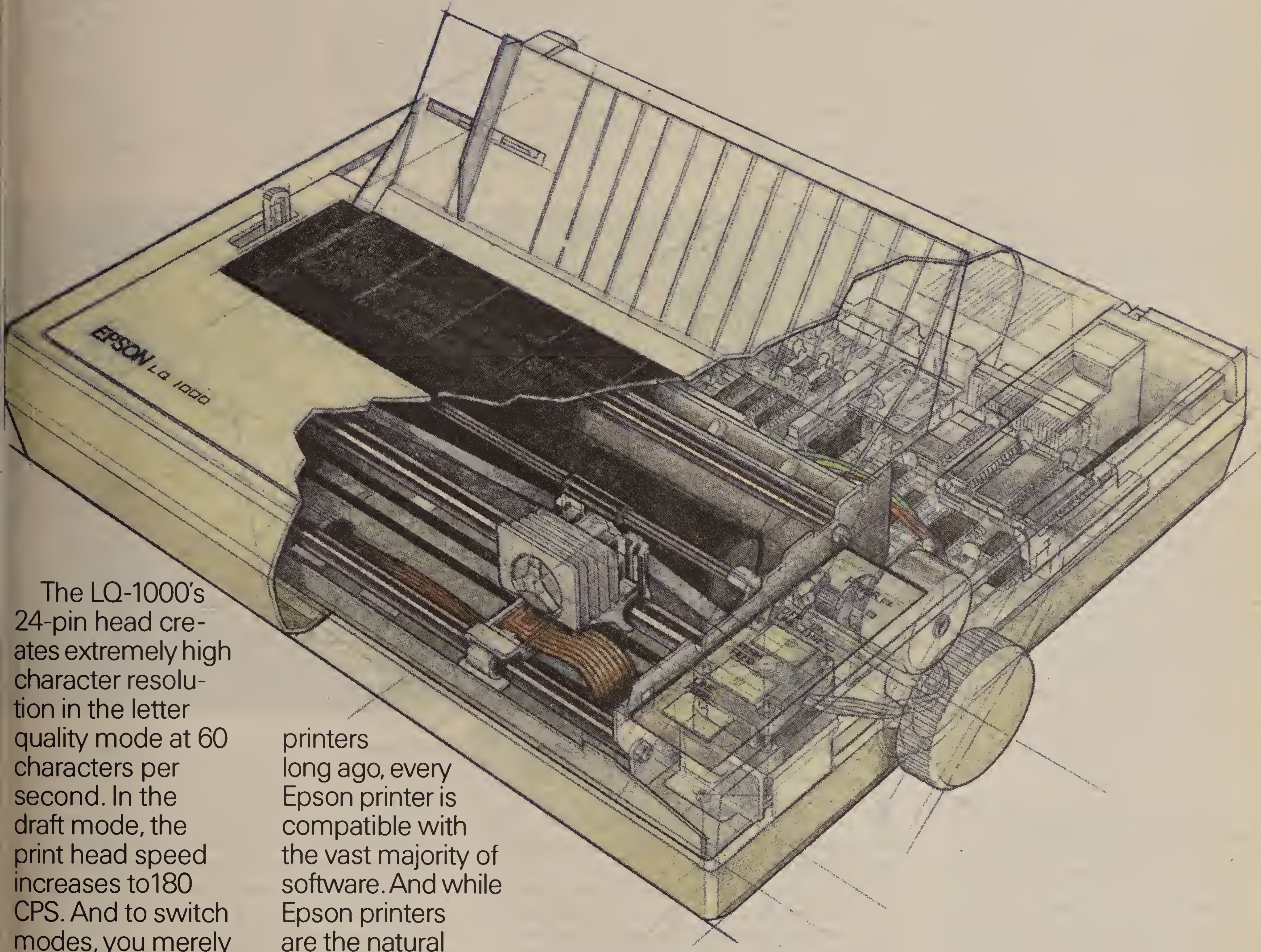
With a highly flexible set of configurations, extra expansion slots, color and monochrome monitors, and high capacity hard disks, each Equity can be fully integrated into your stand-alone or multi-user applications, and tailored to meet almost all your company's personal computing needs. Of course, virtually every hardware enhancement, peripheral and software program designed for IBM personal computers is also compatible with Equity.

Equity personal computers have the processing power, the memory and the storage options to satisfy even the most demanding user... with glorious results.

Which leads us to the Epson LQ-1000.

Latest on a family tree that has made Epson a printer industry leader for more than twenty years, the Epson LQ-1000 is proof that dot matrix technology can be raised to new heights of speed and resolution.

THE GLORY.



The LQ-1000's 24-pin head creates extremely high character resolution in the letter quality mode at 60 characters per second. In the draft mode, the print head speed increases to180 CPS. And to switch modes, you merely press a button.

Glorious output, speed and ease of use are designed into the entire line of Epson printers. A line that includes a whole range of industry leading dot matrix machines in 24 and 9-pin formats, plus color printers and plotters.

Because we set the standard in printers long ago, every Epson printer is compatible with the vast majority of software. And while Epson printers are the natural choice for Epson computers, they also work with every IBM PC compatible personal computer on the market.

Naturally, all this high technology would be useless if we didn't also offer high reliability. That's why our Equity computers are built to the same rigorous standards that have made Epson printers legendary for toughness. And why we back our products with Epson's one year limited warranty.

Epson Equity personal computers and Epson printers. Tangible proof that while others may promise you power and glory, Epson delivers.

For more information about the Epson line of personal computers and printers, call (800) 421-5426, or (213) 539-9140 in California.

Epson is a registered trademark of Epson Corporation. Equity is a trademark of Epson America, Inc. IBM and AT are registered trademarks, and XT is a trademark of International Business Machines Corporation.

EPSON
COMPUTERS
PRINTERS

Continued from page 143

according to the vendor. Other features include an on-board, single-level bus arbiter, floppy disk interface, 24-bit parallel I/O port and multiprotocol communications controller. The Motorola 68000 or 68010 processor runs at 10 MHz, the vendor said.

The PME 68-12 costs $1,847.

Plessey Microsystems, One Blue Hill Plaza, Pearl River, N.Y. 10965.

Graphics systems

International Microcomputer Software, Inc. has introduced its **IMSI RDT Tablet**, a nonmagnetic digitizing tablet.

The IMSI RDT Tablet is said to use resistive decoding technology to transmit coordinate positions from the digitizer to the host computer and to eliminate the need for user calibrations.

The RDT incorporates an interface that allows it to emulate five electromagnetic digitizers, including those from Summagraphics Corp., Houston Instrument Co. and Hitachi America Ltd., the vendor said.

It is priced at $795.

International Microcomputer Software, 1299 Fourth St., San Rafael, Calif. 94901.

■

Pericom, Inc. has unveiled its **MX4000R** rack-mounted color terminal.

The MX4000R is compatible with Tektronix, Inc.'s 4107, 4010 and 4014 in graphics mode and Digital Equipment Corp.'s VT220 and VT100 in alpha mode, the vendor stated. It has a resolution of 640 by 480 pixels and displays 16 colors from a 256K-byte palette. The terminal also utilizes most standard protocols, allowing it to use a range of software, according to the vendor.

The MX4000R costs $4,995 with a VT220 keyboard.

Pericom, Suite 103, 2291 205th St., Torrance, Calif. 90501.

■

National Instruments, Inc. has announced that its **GPIB-1014** general interface bus is compatible with Sun Microsystems, Inc.'s Sun 3 workstations.

The GPIB-1014 interface allows the Sun 3 workstation to be used in a variety of GPIB applications, including automated test and measurement, computer-aided design and manufacturing and data acquisition, according to the vendor.

The GPIB-1014 interface is priced at $1,295.

National Instruments, 12109 Technology Blvd., Austin, Texas 78727.

■

The **MX2000**, a color graphics terminal, has bowed from **Pericom, Inc.**

The terminal is compatible with Tektronix, Inc.'s 4105 and Digital Equipment Corp.'s VT220 Viewdata and Regis terminals, according to the vendor.

It features 640- by 480-pixel resolution and displays 16 colors from a 256K-color palette, the vendor said. Other features of the terminal are said to include swivel and tilt and a small footprint.

The MX2000 is priced at $3,450.

Pericom, Suite 103, 2291 205th St., Torrance, Calif. 90501.

Japan Computer Corp. has unveiled the **Model G3268** color graphics station.

The G3268 has a resolution of 1,280 by 1,024 pixels and can draw in up to 16.7 million colors, according to the vendor. The station offers both two- and three-dimensional graphics in either a 32-bit or a 16-bit format, which is accessible via soft commands.

The bit-mapped raster graphics are reportedly placed on the screen in 24 layers plus a character scroll layer and a cross-hair layer.

Available functions on the terminal are said to include rubber-banding up to 256 points, hatching up to 512 squares, scaling rotation, translation and picking.

The G3268 costs $28,950.

Japan Computer, One Bridge Plaza, Fort Lee, N.J. 07024.

Japan Computer Corp. has unveiled its **G5068** Color Graphics Workstation.

The G5068 includes the company's G3268 color graphics station with a computer based on the Motorola, Inc. 68020 32-bit microprocessor. The workstation can function in either two or three dimensions via keyboard commands and is said to be switchable to either a 16-bit or 32-bit mode.

The graphics terminal provides 1,280- by 1,024-pixel resolution on its 19-in. screen, according to the vendor. The workstation reportedly runs software under AT&T's Unix System V operating system with a 4M-byte main memory with C, Fortran 77 and LISP language capability.

The G5068 costs $39,950.

Japan Computer, One Bridge Plaza, Fort Lee, N.J. 07024.

Data storage

Distributed Logic Corp. has introduced the **DQ302** cartridge tape controller.

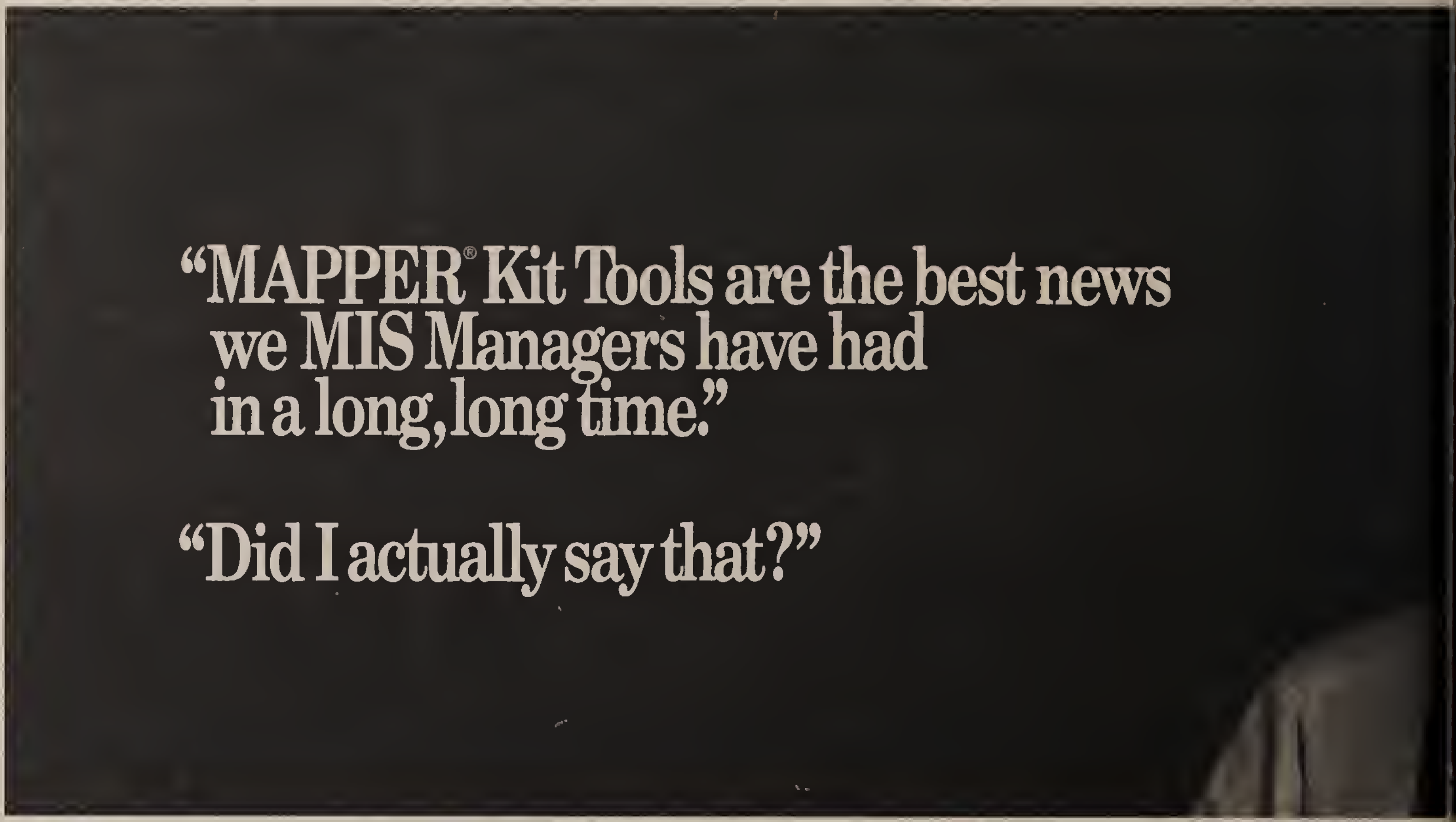
The DQ302 is said to allow users to interconnect any QIC-02-compatible ¼-in. tape drive to Digital Equipment Corp. Q-bus computers.

The DQ302 controller reportedly has a 16K-byte record-buffer memory.

The controller is contained on a single, dual-height board and comes with an automatic self-test feature that causes on-board microdiagnostics to be run each time power is applied to the controller.

The DQ302 is priced at $1,300, the vendor said.

Distributed Logic, P.O. Box 6270, 1555 S. Sinclair St., Anaheim, Calif. 92806.



"MAPPER® Kit Tools are the best news we MIS Managers have had in a long, long time."
"Did I actually say that?"

In our business, the millennium arrives about every other week—just check the ads.

So when I first heard about Sperry's new MAPPER Kit technology, I was—shall we say—somewhat skeptical. It sounded much too good to be true.

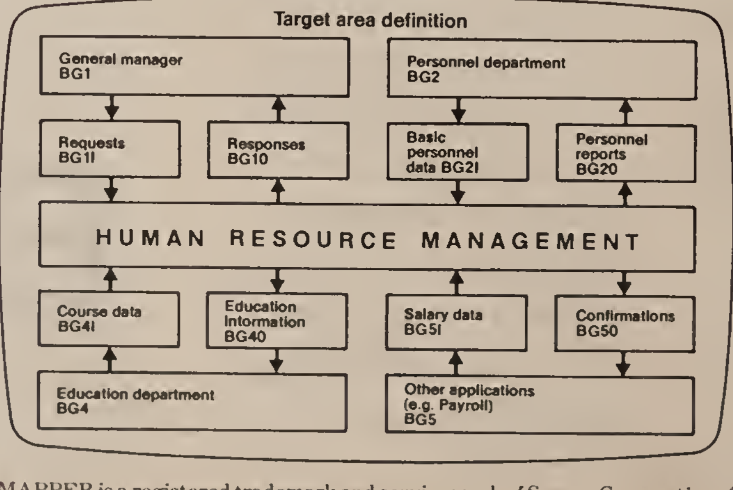
The main thrust is this: MAPPER Kit provides a set of design methodologies and software tools that automate the entire life cycle of applications. It streamlines the whole process—from initial concept through systems analysis, detailed design, implementation, operation, and maintenance.

To hear it told, the only thing lacking is a guaranteed salary increase and a laurel wreath for the buyer.

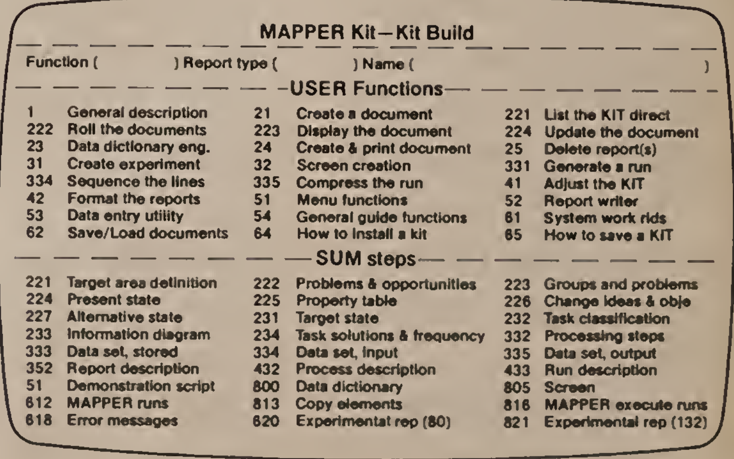
However, to a person in my situation, drowning in a sea of backlogged applications, something like MAPPER Kit couldn't have surfaced at a better time. So, after much study (and some characteristic indecision), I signed up for a trial.

Logically enough, MAPPER Kit Tools are based on Sperry MAPPER Software, which Sperry says is "a step beyond the fourth generation." Sperry does have a point there—the software certainly has a greater depth and breadth of functionality than anything I've seen. (It also has a sizable legion of loyal users—

Computer-generated SUM diagrams such as this help you and the end-user analyze the functions of the application.



This is the MAPPER Kit Tools development menu. Powerful commands and functionality make it a joy and a delight to work with.



```
                     MAPPER Kit—Kit Build
— — — — — — — — — — — — — — — — — — — — — — — — — — — — — —
Function (          ) Report type (          ) Name (                    )
— — — — — — — — — —USER Functions— — — — — — — — — — — — —
1    General description    21   Create a document        221  List the KIT direct
222  Roll the documents     223  Display the document     224  Update the document
23   Data dictionary eng.   24   Create & print document  25   Delete report(s)
31   Create experiment      32   Screen creation          331  Generate a run
334  Sequence the lines     335  Compress the run         41   Adjust the KIT
42   Format the reports     51   Menu functions           52   Report writer
53   Data entry utility     54   General guide functions  61   System work rids
62   Save/Load documents    64   How to install a kit     65   How to save a KIT
— — — — — — — — — — — —SUM steps— — — — — — — — — — — — —
221  Target area definition 222  Problems & opportunities 223  Groups and problems
224  Present state          225  Property table           226  Change ideas & obje
227  Alternative state      231  Target state             232  Task classification
233  Information diagram    234  Task solutions & frequency 332  Processing steps
333  Data set, stored       334  Data set, input          335  Data set, output
352  Report description     432  Process description      433  Run description
51   Demonstration script   800  Data dictionary          805  Screen
612  MAPPER runs            813  Copy elements            816  MAPPER execute runs
618  Error messages         620  Experimental rep (80)    821  Experimental rep (132)
```

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NEW PRODUCTS/SYSTEMS & PERIPHERALS

U.S. Design Corp. has introduced its **1108-03** and **1158-03** host adapters, said to emulate Digital Equipment Corp.'s mass storage control protocol.

The 1108-03 and 1158-03 use the small computer systems interface (SCSI) to provide communication between the host CPU and the optical disk drive. Features include the ability to control optical data storage volume and partitioning via an on-board option switch and SCSI "pass-through" capabilities for specific custom applications software development.

The 1108-03, priced at $2,000, supports the DEC Microvax and Micro-PDP systems; the 1158-03, priced at $2,500, supports DEC VAX and PDP-11 Unibus systems.

U.S. Design, 5100 Philadelphia Way, Lanham, Md. 20706.

National Semiconductor Corp. has introduced the **NS865-16**, a 16M-byte memory card that is said to be compatible with Digital Equipment Corp.'s VAX 8600 and 8650 computers.

The NS865-16 occupies a single card slot and features on-board diagnostics that allow service personnel to verify the status of each memory board without loading system diagnostics.

It is also equipped with an on-line/off-line switch with an LED indicator.

The switch reportedly allows the memory to be electrically removed from the system without physically removing it from the backplane.

The NS865-16 is priced at $25,000.

National Semiconductor, P.O. Box 58090, 2900 Semiconductor Drive, Santa Clara, Calif. 95052.

Printers/Plotters

Black Box Corp. has introduced the **Multi-Port Spooler II**.

The device is available in two versions. The first allows users to connect and dedicate five computers and one printer; the second allows four computers and two printers to be connected.

The spooler accepts data from multiple terminals or computers and outputs the data to the printer as though it had been sequentially received, the vendor said. The spooler sends data at rates up to 19.2K bit/sec.

Multi-Port Spooler II for the five-to-one connection costs $649; the four-to-two version costs $749, the vendor said.

Black Box, P.O. Box 12800, Pittsburgh, Pa. 15241.

Rena Systems, Inc. has unveiled its **UP 332 Universal** printer.

The UP 332 reportedly prints both text and addresses onto forms and mail pieces, including envelopes, mailers, cards, single-sheet letters, invoices, labels or snap-out forms.

It can print in either boldface or wide characters, in different character densities and in draft- or letter-quality mode.

The printer's floating print head is said to adjust automatically to handle any thickness of mail piece up to .059-in. The UP 332 prints 150 char./sec., and it comes with an automatic sheet feeder. An optional conveyor and stacker holds up to 1,000 sheets or 500 envelopes, the vendor stated.

The UP 332 is priced at $4,395.

Rena Systems, 290 Hansen Access Road, King of Prussia, Pa. 19406.

■

Turbograph 300 Series II, a stand-alone vector-to-raster processor with multiplexing capabilities, has been released by **AMF Logic Sciences, Inc.**

The processor is said to convert data supplied by up to seven host computers to a format that can be printed on plotters and printers. The processor is compatible with Hewlett-Packard Co.'s HP/GL and Houston Instrument Co.'s DM/PL graphics languages and supports application packages including Lotus Development Corp.'s 1-2-3 and Symphony, according to the vendor.

Turbograph has input memory of 512K bytes, allowing storage of up to 80,000 vectors, the vendor said.

The standard 512K-byte memory is upgradable to 2M bytes.

The Turbograph 300 Series II costs $2,995.

AMF Logic Sciences, 10808 Fallstone Road, Houston, Texas 77099.

■

Aedex Corp. has enhanced its **Aedex Laserbar-608** bar code printing system.

The Laserbar-608 reportedly uses laser technology and can interface to any computer system using Centronix Data Computer Corp. parallel or RS-232 serial interfaces.

It is said to be capable of printing bar codes and varying styles and sizes of alphanumerics and graphics from any software. Laserbar-608 produces bar code symbols on single sheets of paper, vinyl or mylar stock with plain or coated backing at 8 sheet/min.

The Laserbar-608's memory has been doubled to 768K bytes for the price of $4,995.

A 1.2M-byte unit is available at a price of $5,895.

Aedex, Suite C, 181 W. Orangethorpe, Placentia, Calif. 92670.

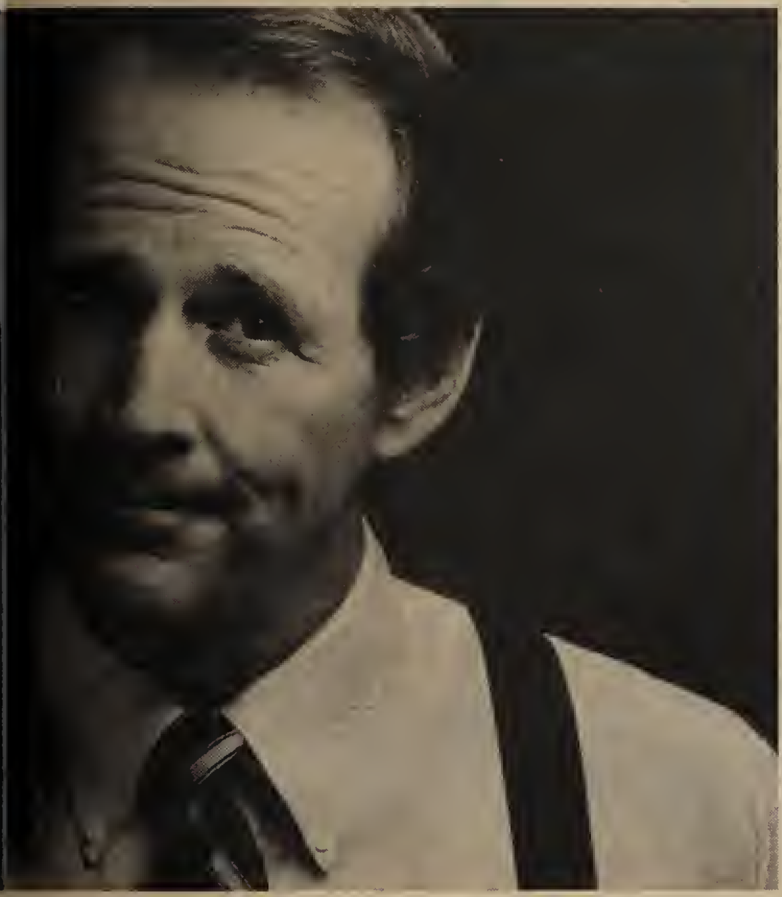
■

JDL, Inc. has added Toshiba America, Inc. P351C and Fujitsu America, Inc. DPL24C printer compatibility to its **GL Processor**, a vector-to-raster protocol converter.

The converter incorporates a Motorola, Inc. 68000 microprocessor and up to 3M bytes of random-access memory.

It is said to receive vector files from the host computer at the maximum transmission rate, then free up the computer while concurrently

Continued on page 148



over a half-million of them. Amazing.)

But back to MAPPER Kit. Once you get into it, you'll find that the Kit allows you to concentrate on business analysis and solution definition, rather than programming. With MAPPER Kit Tools, the important task of analysis occupies 85% of the effort; implementation, 15%. Your department will be able to produce four to ten applications in the time it would normally take to produce just one.

There are many reasons for this seemingly incredible leap in productivity.

For one thing, end-users are directly involved in computer-aided application analysis, up front. Is that good, you ask? With SUM, it certainly is (no pun intended). SUM (Sperry Universal Model) disciplines the whole process, from defining the application environment to establishing data structures and processing rules.

Since the end-user can see what's happening, right there on a terminal screen, you quickly get a near-perfect correlation between what the user needs and what you're giving him/her. As a by-product, the end-user learning process is greatly accelerated. You might say that SUM is greater than the whole of its parts.

The same kind of discipline applies to the actual design of the application, which MAPPER Kit Tools make a standardized procedure. You work with a development menu of powerful commands and—get this—no matter who develops the application, all documentation will be standardized. In fact, the documentation which describes the application actually becomes a living part of the solution. Hallelujah.

The design functions are part of MAPPER Kit's "KitBuild" software, which includes a number of other neat features that, in total, springboard you right into implementation. Since MAPPER reports are the database structure, all the user has to do is just plug in the data and take off.

But the real clincher is that end-users do most of their own maintenance. With MAPPER Kit's "KitAid" software, end-users have a window into their authorized applications via standardized menus and help facilities. They also get a whole array of powerful utilities. A user can readily make ad hoc modifications by changing data characteristics and/or functions, or even adding new capabilities. However, access to the system is strictly controlled, according to access levels that you assign.

There's a whole lot more I could tell you, like the fact that MAPPER Kit Tools can work as an adjunct to systems you already have installed. Matter of fact, through Sperry's MAPPER Executive Information Service Center (MEISC) timesharing service, you can have an on-line MAPPER System without actually buying or leasing a computer. You can even sign up for just a short-term trial, at an affordable cost.

But enough already. If I keep going on like this, the next thing you know, Sperry will be putting me in an ad.

And I don't know if I could handle that.

Would you like to see how MAPPER Kit can help get *your* backlog off your back? Then you should see a demonstration or, next best thing, get hold of our Information Package No. 11. Either way, call us toll-free 800-547-8362. Or write: Sperry Corporation, Box 500, Dept. 100, Blue Bell, PA 19424-0024.

MAPPER® Software. For whatever you have in mind.

SPERRY

Continued from page 147

managing the data conversion and printing.

The converter also operates as a high-capacity print spooler for word processing or data processing, the vendor said.

It is available in two models: the Model 15 with 1.5M bytes of memory, priced at $1,290, and the Model 30, with 30M bytes of memory, priced at $1,690.

JDL, Suite 104, 2801 Townsgate Road, Westlake Village, Calif. 91361.

■

Primeline has introduced its **Model SPL-430** graphics plotter.

The plotter is said to feature A- or B-size media capability and high-speed and six-pen multicolor functions. It also features Hewlett-Packard Co. graphic language plotting language commands, RS-232C and Centronics Data Computer Corp. interfaces, a 1,024-byte buffer and 20 resident character printing sets.

The pen speed is programmable and can reportedly be as fast as 56.5 cm/sec. Its resolution is said to be .025 mm. The plotter also includes a user keypad, universal pens and programmable pen select.

The Model SPL-430 costs $1,595.

Primeline, P.O. Box 670, San Fernando, Calif. 91341.

■

Versatec, Inc. has released its **Model 890** and **Model 895 Versatec Plot Servers.**

The Versatec Plot Servers are said to provide single- or multiprocessor servers that off-load the host computer or workstation of time-consuming and costly graphics data processing. With the plot servers, users are able to eliminate plotting bottlenecks and off-load application workstations, the vendor said.

The Model 890, for light to medium density, plots at 200 point/in. in color and monochrome. The Model 895 for high density plots in either monochrome or color at 400 point/in.

The Model 890 Versatec Plot Server costs $22,000. The Model 895's price starts at $30,500.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051.

■

Western Telematic, Inc. has announced its **PSU-81B** printer sharing unit.

The PSU-81B reportedly allows up to eight computers and terminals, word processors or computer-aided design and manufacturing systems to share a common printer or printers. It includes a 256K-byte spooling buffer, with a storage capacity of 128 pages, that provides the capability to feed data from a 9.6K bit/sec. computer to a printer or plotter operating at 300 bit/sec., according to the vendor. Output ports for both serial and parallel printers are also provided, allowing two printers to operate simultaneously.

The PSU-81B costs $795.

Western Telematic, 2435 S. Anne St., Santa Ana, Calif. 92704.

■

Black Box Corp. has introduced its **Six Shooter** parallel printer switch.

The Six Shooter, priced at $415, reportedly allows six personal computers to share one printer or vice versa. The add-on module, called Six Shooter Plus and priced at $315, expands the switching capability, allowing the sharing of 12 computers or 12 printers.

Also available is Auto Six Shooter, priced at $462, which has a built-in printer sharing function that automatically scans six computer ports for data ready to print.

The Code Operated Six Shooter, priced at $475, allows the selection of one of six printers by sending a two-character switching code.

Black Box, P.O. Box 12800, Pittsburgh, Pa. 15241.

■

The **Bradywriter II** dot printer has bowed from the **Industrial Products Division** of **W. H. Brady Co.**

The Bradywriter II is a portable dot matrix printer and is said to provide the user with on-board file storage for label messages, file storage for different size labels and markers and the ability to retain these files when the unit is switched off. It can print up to 120 char./sec. and can print Code 39 at up to 7.5 char./sec., according to the vendor.

Bradywriter II costs $2,795.

W. H. Brady, Industrial Products Division, P.O. Box 2131, 2221 W. Camden Road, Milwaukee, Wis. 53201.

■

JRL Systems, Inc. has introduced the **Model 1100**, a Sperry Corp. Word Channel Interface.

The Model 1100 was designed to provide signal compatibility and data buffering between Sperry 1100 series computers and various high-speed graphics devices such as graphic controllers. The Model 1100 can support graphics devices in raster mode or operate as a front end to one of several controllers that perform vector-to-raster conversion.

The Model 1100's price starts at $10,000.

JRL Systems, Building E-2, 5524 Bee Cave Road, Austin, Texas 78746.

■

Versatec, a Xerox Corp. company, has announced support of AT&T Unix operating systems with its release of **Versaplot Random 2.0** software.

Versaplot Random 2.0 generates plots on all Versatec electrostatic

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TORONTO (NOV. 4 or 5)
CHICAGO (NOV. 12 or 13)
NEW YORK (NOV. 17 or 18)

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plotters from Unix operating systems. It supports eight line colors, 256 predefined area colors and unlimited user-definable area colors and monochrome plotting on Versatec plotters. The software provides a user-definable clipping window, plotting viewport and pen attributes, the vendor said.

Versaplot Random 2.0 is available on a 9-track magnetic tape or tape cartridge and costs $2,000.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051.

■

Rena Systems, Inc. has introduced the **KST-4** burster and decollator.

According to the vendor, the KST-4 can decollate, burst, remove carbons, trim tractor margins and separate and stack multiple-part forms in a single operation. The KST-4's output rates depend on form length, the vendor said. In one hour, the KST-4 reportedly can process 3,300 11-in. forms, 6,000 6-in. forms or 9,000 4-in. forms.

The KST-4 is priced at $7,495, the vendor stated.

Rena Systems, 290 Hansen Access Road, King of Prussia, Pa. 19406.

■

Soabar, an Avery International Co. company, has announced its **SPX-30**, a computer-controlled thermal transfer printer for use with tags and labels.

The SPX-30 is said to create 0.80 ratio universal product code and other common bar codes as well as optical character recognition — a scannable type font — and several conventional type styles. It is said to offer 90-degree character rotation, printing horizontally or vertically on the tag.

The SPX-30 prints all major bar codes. The data input is supplied by a laptop computer with a full keyboard.

The printer costs $6,000.

Soabar, 7722 Dungan Road, Philadelphia, Pa. 19111.

Power supplies

Kalglo Electronics Co. has enhanced its **Line-Saver Model LS250, LS500** and **LS750** standby, uninterruptible power systems.

The models are now equipped with circuitry said to detect miswired electrical outlets, a common source of data loss or contamination of computer files, as well as actual destruction of computer microcircuitry.

The integrity checker function is implemented using a neon light that glows when the hot and neutral wires are reversed in the power outlet.

Prices start at $549.

Kalglo Electronics, Colony Drive Industrial Park, 6584 Ruch Road, E. Allen Township, Bethlehem, Pa. 18017.

■

Displex, Inc. has introduced the **DEL-1500** and **DEL-3000**, two series of electronic loads for testing power supplies, batteries or other power devices.

The two series are said to be powered from a 208V, three-phase, 60Hz line and provide loads from 10% to 100% of their respective power ratings at voltages from 5V to 120V.

The loads can be operated in a constant current or constant-resistance mode and are protected against overcurrent, short circuits and reverse voltage.

The units are packaged in a 19-in. rack. The DEL-1500 costs $1,975, and the DEL-3000 costs $3,295.

Displex, 1 Alexander Place, Glen Cove, N.Y. 11542.

Dranetz Technologies, Inc. has announced its **Series 656 Disturbance Waveform Analyzer.**

The Series 656 is said to feature a touch-sensitive CRT that allows an operator to view a power line disturbance, outline an area of interest and view an enlarged display for important detail.

Up to a month's disturbance can be stored in memory, edited and formatted in a report with summations and wave-form traces, according to the vendor.

The product monitors single-phase, three-phase and neutral-to-ground AC inputs to sensitive electronic equipment. It also monitors up to eight additional DC outputs from environmental transducers, the vendor stated.

The Series 656 Disturbance Waveform Analyzer is priced at $9,750, according to the vendor.

Dranetz Technologies, P.O. Box 4019, Edison, N.J. 08818.

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Electronic Specialists, Inc. has introduced **Sine-UPS**, an on-line, sine wave uninterruptible power supply.

Sine-UPS is said to be capable of providing up to 20 minutes of power during extended power outages. The products operates without disruptive switching transients and incorporates an automatic internal battery recharge, according to the vendor.

Wideband electromagnetic interference, radio frequency interference filtering and spike suppression are provided.

A test switch allows power removal to check front panel monitors and complete system operation, the vendor stated.

Sine-UPS is priced at $1,095 for the 250W version. The 500W version is priced at $1,495.

Electronic Specialists, 171 S. Main St., Natick, Mass. 01760.

Terminals

Esprit Systems, Inc. has added **Opus 2** to its line of ASCII terminals.

Opus 2 is said to incorporate a small footprint and a 14-in. flat-screen display with a "touch-tilt" swivel mechanism. The terminal comes in amber, green or white.

Opus 2 offers 26 data lines, including two status lines, in either 80- or 132-col. format, according to the vendor. Opus 2 is said to emulate the Wyse Technology, Inc. 50 and Televideo Systems, Inc. 925 and 910 computers and is compatible with operating systems that include AT&T's Unix.

The Opus 2 costs $549.

Esprit Systems, 20655 Western Ave., Torrance, Calif. 90501.

■

Mitsubishi Electronics America, Inc. has introduced its **FHF** series of 14-in. V flat monitors.

The monitors are said to feature in-line gun and analog input. The three models in the series feature 0.31 dot pitch, tap changing power supply and 50Hz to 45Hz bandwidth.

All the monitors are available with optional tilt and swivel bases. The Model FHF3500 monitor offers 1,024- by 780-pixel resolution with a horizontal scan rate of 30 kHz to 35 kHz, the vendor said. The FHF2500 has a horizontal scanning frequency of 20 kHz to 25 kHz, and the FHF1500 offers 15.5 kHz to 20 kHz.

Each monitor costs $1,500.

Mitsubishi Electronics America, 991 Knox St., Torrance, Calif. 90502.

Auxiliary equipment

Compuscan, Inc. has added **alpha handprint recognition** to its **Laser Data Entry System** (LDES).

LDES is a supermini-based scanner system said to electronically read and process data printed or marked on 2.9-in. by 2½-in. to 8½-in. by 14-in documents. The alpha recognition is said to aid in handling applications containing names, addresses and lists.

LDES captures data directly from source documents at speeds up to sixty times faster than manual keying, according to the vendor.

LDES with alpha handprint pricing begins at $139,000, depending on configuration.

Compuscan, Building 2, 81 Two Bridges Road, Fairfield, N.J. 07066.

■

Automation Facilities Corp. has released **Floppiclene**, a disk drive head cleaning kit.

Floppiclene reportedly contains up to 50 cleaning diskettes per kit. According to the vendor, the cleaning diskettes are completely nonabrasive and can be used on single- and dual-sided drives. All kits include an aerosol cleaning solvent and are available for 3½-, 5¼- and 8-in. drives.

The Floppiclene Model 520 kit for the 5¼-in. drive and the Model 310 kit for the 3½-in. drive each are priced at $19.95.

Automation Facilities, 6383 Rose Lane, Carpinteria, Calif. 93103.

■

The Advanced Engineering Unit of **Zero Corp.** has introduced **Static Alert**, an electrostatic monitoring system.

Static Alert reportedly detects static electricity as low as 1 kV within six feet of its sensing antenna and then ac-

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tivates a visible and audible alarm when static enters the work area.

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The alert control module features warning lights, a keyboard for enable and disable wrist-strap functions and a key for disabling the audible warning signal when an electrostatic charge is detected.

The complete system sells for approximately $450.

Zero Corp., 6900 Beck Ave., North Hollywood, Calif. 91605.

■

Ohm/Electronics, Inc. has introduced the **Model DDC 301** and **Model SCK5.25** disk-drive cleaning kits.

The Model DDC 301 is available for any 3½-in. disk drive and the Model SCK5.25 is available for 5¼-in. disk drives.

Each kit reportedly contains a high-grade cleaning diskette, usable up to 15 times per side, and a supply of quick-drying head cleaning fluid.

The user puts five drops of cleaning fluid in the two diskette cutouts, inserts the diskette in the drive and operates the unit for 30 seconds, the vendor said.

On the 5¼-in. disk drive cleaning kit, provisions are made to accommodate either single- or dual-sided drives.

The Model DDC 301 costs $7.95, and the Model SCK5.25 is priced at $6.95.

Ohm/Electronics, 746 Vermont St., Palatine, Ill. 60067.

Clearpoint, Inc. has introduced **Versaram**, a Versabus-compatible add-in memory board.

Versaram reportedly offers a memory range of 1M to 16M bytes and features 24- or 32-bit addressing and sequential access.

It also provides single-bit correction, double-bit detection, error scrubbing and 64-bit caching, according to the vendor.

Versaram is said to be fully compatible with the IBM System 9000 and Charles River Data Systems, Inc. Universe Systems as well as Versabus systems.

The 16M-byte version of Versaram starts at $18,200.

Clearpoint, 99 South St., Hopkinton, Mass. 01748.

PRICE REDUCTIONS

CIE Systems, Inc.'s Peripheral Products Group has reduced the prices of its **CIE 7800 series** IBM 3270-compatible terminals.

The terminals feature high-resolution, 14-in. monitors with 1,920-char. screen formats.

Other features of the terminals include an RS-232C printer port, screen saver, security set-up mode with password and cursor position indicator and time-of-day clock. The 7815A is also said to feature Digital Equipment Corp. VT100 compatibility.

The IBM 3178-compatible CIE 7801 is now priced at $795; the IBM 3278-compatible 7815 is now priced at $990; and the 7815A is now priced at $1,495.

CIE Systems, 2515 McCabe Way, Irvine, Calif. 92714.

■

NEC Information Systems, Inc. has reduced the price of its IBM Personal Computer AT-compatible **APC IV** advanced PC.

The APC IV is available in three configurations. The Model H401K, which includes CPU, a 1.2M-byte floppy disk drive, a 40M-byte internal disk drive and a keyboard, has been reduced from $5,045 to $3,995.

The Model H400K, which includes CPU, a 1.2M-byte floppy disk drive and keyboard, now costs $2,995.

The Model H402K, which includes a 1.2M-byte floppy disk drive, a 20M-byte internal hard disk drive and CPU, now costs $3,495.

NEC Information Systems, 1414 Massachusetts Ave., Boxboro, Mass. 01719.

■

Houston Instrument Co. has announced price reductions for its single-pen **DMP-51/52** and **DMP-51/52 MP** series of plotters for computer-aided design applications.

Both plotter series are said to feature a maximum plotting speed of 22 in./sec., a selectable acceleration up to 4G and a resolution of 0.001 in.

The plotters can operate with any computer that supports an RS-232C-compatible port.

The DMP-51/52 series now costs $4,695, and the DMP-51/52 MP series now costs $5,295.

Houston Instrument, 8500 Cameron Road, Austin, Texas 78753.

■

Ungermann-Bass, Inc. has reduced the price of its **Personal Network Interface Unit** card.

The Personal Network Interface Unit, which fits into one expansion slot of a personal computer, is a single-board interface unit.

The unit connects an IBM Personal Computer or compatible microcomputer to Ungermann-Bass's Net/One Personal Connection local-area network.

The Personal Network Interface Unit is now priced at $895, according to the vendor.

Ungermann-Bass, 2560 Mission College Blvd., Santa Clara, Calif. 95052.

■

Omnicomputer, Inc. has reduced its **time-sharing rates** on Digital Equipment Corp.'s VAX 8600 computers.

Time-sharing provides a way for users to develop and test new software, especially when there is a data processing overflow, according to the vendor. Time-sharing is also said to be useful as an auxiliary computer backup.

Omnicomputer's time-sharing rates have been reduced from $14 to $10 per connect hour, according to the vendor.

Omnicomputer, 1430 Broadway, New York, N.Y. 10018.

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IBM's Federal Systems Division looks to commercial sector

Expansion includes integration projects

By Mitch Betts

BETHESDA, Md. — Tucked away in IBM's Federal Systems Division (FSD) in Bethesda is a special organization that does not do much federal systems work. Sometimes the equipment it installs is not even IBM's.

This unusual venture, with a staff of 5,500, is called the Complex Systems Organization. It was formed in December 1985 to expand the FSD's experience with the integration of government systems into the private sector.

The genesis of the organization was in 1983, when the FSD expanded its systems integration business beyond defense, space and aviation electronics into computer systems integration throughout the federal government.

"We were seeing a trend in which the federal government was using a systems integrator more frequently to put together some of these large bids," Gerald W. Ebker, the division's vice-president of complex systems, said in a recent interview. "We think that trend is going to start occurring in the commercial sector as well."

The next logical step was to expand into the commercial sector, so IBM gave the FSD the go-ahead to experiment with some commercial contracts during 1985 and officially launched the Complex Systems Organization in December.

So far, the organization has won several high-profile contracts, including a venture with United Airlines to develop a travel agency automation system [CW, Feb. 24] and a $25 million contract to develop a nationwide administrative system and network for 477 hospitals affiliated with Nashville-based Hospital Corp. of America.

Ebker said the Complex Systems Organization also serves as technical leader for IBM's work on Ford Motor Co.'s comprehensive office automation strategy [CW, July 28].

Nevertheless, IBM officials admit that few commercial customers are aware of the Complex Systems Organization or of the fact that IBM does systems integration. "It's only been in the last couple of weeks that IBM has even announced to its sales force that we're officially in place and doing our thing," Ebker said.

He said the organization takes referrals from the sales force when a customer's request is beyond IBM's standard product line and requires a systems integrator.

> ***"It's only been in the last couple of weeks that IBM has even announced to its sales force that we're officially in place and doing our thing."***
>
> — Gerald W. Ebker
> IBM's Federal Systems Division

Naturally, IBM acting as systems integrator has a bias toward IBM hardware and software. However, according to Ebker, "practically every bid we make has some degree of non-IBM content — and a significant amount, I might add."

IBM obviously must turn to another vendor's product when IBM does not have a product in a particular niche. In addition, Ebker said the Complex Systems Organization selects a non-IBM product if the equivalent IBM product is judged to be inferior.

"In those cases, we typically get asked by the corporation to explain to them why we selected that other product," Ebker said. But he added that the process of explaining such a decision helps the corporation learn more about the marketplace, because the Complex Systems Organization is acting objectively.

But Ebker made it clear that the ultimate goal of IBM's foray into systems integration is to get IBM computers installed. "If a particular integration opportunity gets to the point where it's a minimal amount of IBM hardware, we'll probably pass up the opportunity, as opposed to being involved in it just for the sake of integration," he said.

Two other IBM units have also gotten on the systems integration bandwagon: the Information Systems Group's Customer Sector Organization, based in Rye Brook, N.Y., and the Information Services unit, based in Milford, Conn. Ebker said he does not know whether his unit will stay in the FSD or be aligned with the commercial sector units of IBM.

IBM's competitors in this field are numerous; they include General Motors Corp.'s Electronic Data Systems Corp. subsidiary, Burroughs Corp.'s System Development Corp. subsidiary and several accounting firms.

One competitive advantage enjoyed by IBM, Ebker noted, is that the Complex Systems Organization will steer clients away from systems strategies that would be incompatible with IBM's product plans.

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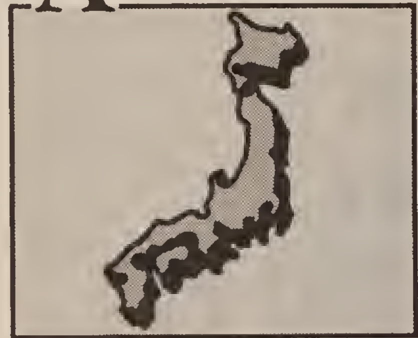

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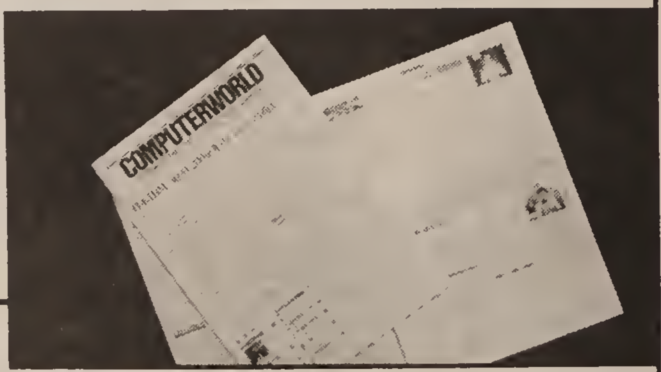

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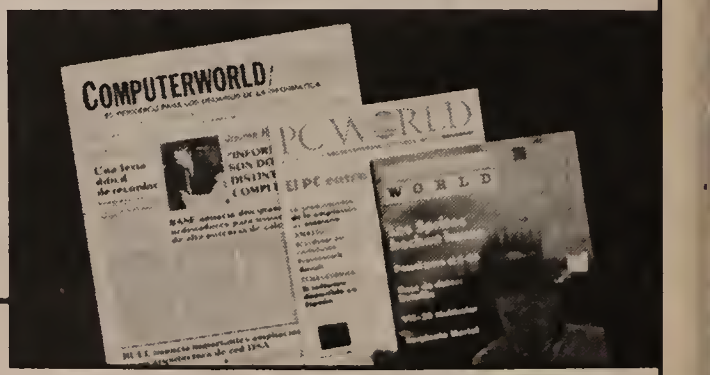

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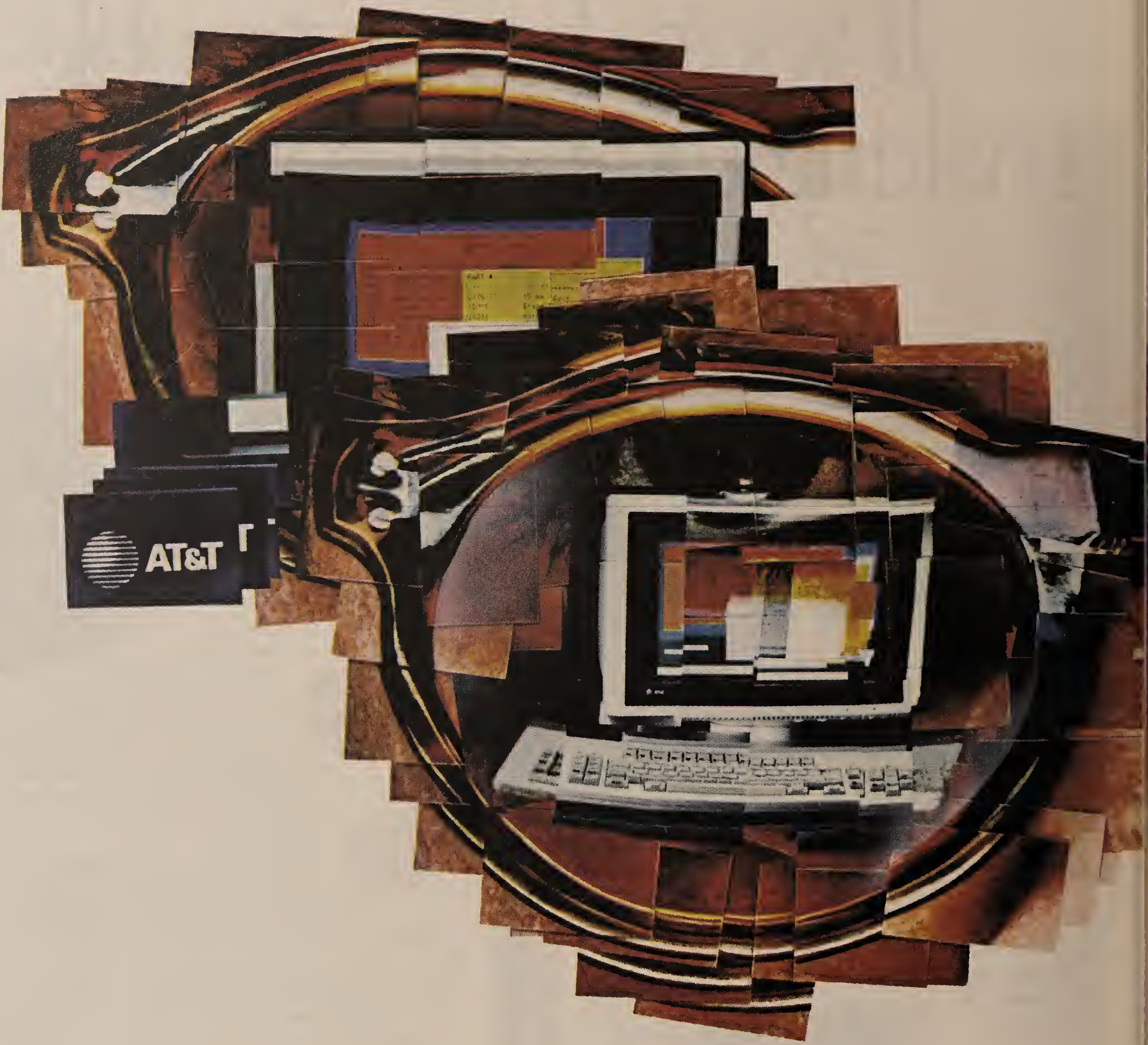

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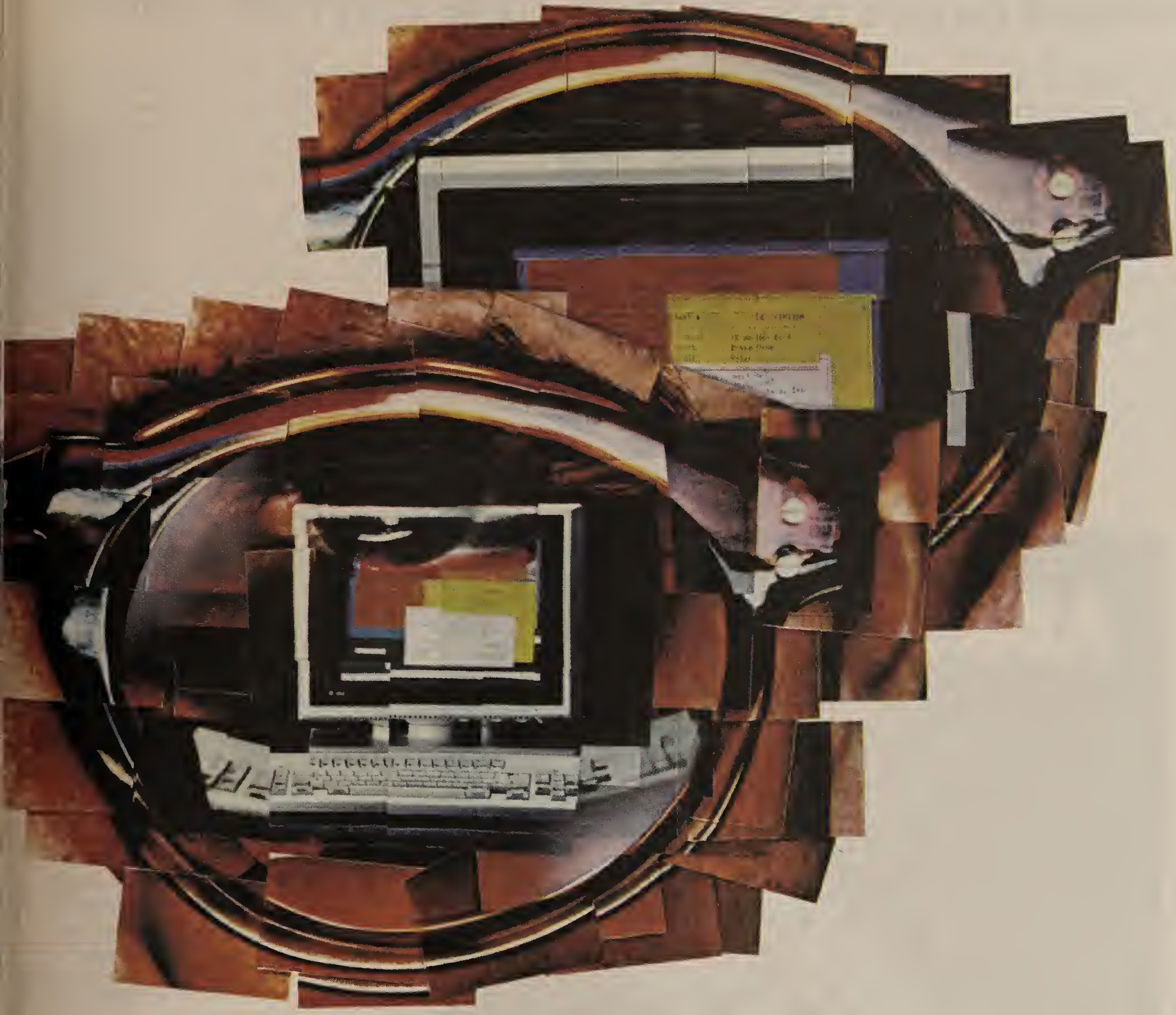

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Convergent targets new markets, aims to reverse slump

Sales, earnings drop again in third quarter

By James A. Martin

SAN FRANCISCO — Although Convergent Technologies, Inc. will report lower sales and an earnings loss for its third quarter ended Sept. 30, the San Jose, Calif.-based vendor hopes to turn its recent misfortunes around by moving in new directions.

"Our original strategy of relying on a small number of OEM customers to provide the bulk of our business was not adequate," Convergent President Paul C. Ely Jr. said at a recent securities analysts' meeting. "The time has come to extend that strategy, and we intend to work and grow and enhance our relationship with both large and small customers."

Convergent plans to triple its sales force and to add more partners in the OEM and value-added reseller (VAR) markets. On the product side, the firm will develop multiuser workstations, based on the Intel Corp. 80386 microprocessor, that will run both the Microsoft Corp. MS-DOS and Unix operating systems.

Convergent's Ely

At the meeting, the company released six Unix-based multiuser work group servers and accompanying software. The S/Series, as the line is called, is based on the Motorola, Inc. MC68010 and 68020 microprocessors. However, Ely said Convergent is firmly committed to the 80386 and will release Unix-based workstations using that chip in November.

Convergent's shipments of its Unix-based personal computer continued to drop during the third quarter, according to John M. Russell, chief financial officer. In addition, he said, the company experienced "very disappointing revenues from other customers, so that there was no increase from them to offset the loss of revenues from AT&T."

The decline in sales to AT&T was due mainly to the major restructuring of the telecommunications and computer giant, Ely said. Convergent's final contract with AT&T, however, allows Convergent to sell the Unix-based computer on its own and to develop additional capabilities and enhancements for that machine.

Corporate goals

Ely outlined Convergent's corporate goals following several months of misfortunes, including the firm's failed merger with 3Com Corp. and staff reductions of 26%.

Convergent's goals are to stabilize its OEM and VAR businesses by not depending on large customers — such as AT&T — for the bulk of its income and to become a leader in turnkey solutions for small businesses through its recently announced Small Business Services unit, Ely said.

The firm also hopes to increase its sales force from 30 to 100, to build a strong marketing program and to exceed $800 million in annual revenue by 1990, according to Ely.

> ***'Convergent possesses excellent engineering and product development. . . . It's a company with a lot of drive, but its main weakness has been in marketing and in lack of controls.'***
>
> — James M. Meyer
> Janney Montgomery Scott, Inc.

Convergent's sales have dropped in every quarter since the third quarter of 1985, when the firm posted sales of $101 million. Convergent reported sales of $58.1 million in the second quarter of this year.

Observers say they believe that Convergent is beginning to attack some of the weaknesses that have contributed to its recent financial decline. "Convergent possesses excellent engineering and product development," according to James M. Meyer, director of research at Janney Montgomery Scott, Inc. in Philadelphia. "It's a company with a lot of drive, but its main weakness has been in marketing and in lack of controls.

"So," Meyer added, "they will soon have the controls needed, the products, the engineering, and they're working on their marketing, so they ought to have a growing company. Also, they didn't have leading-edge products, but their 386 products will offer that."

Convergent officials declined to forecast fourth-quarter or 1987 results. However, Meyer said that despite the company's attempts, 1987 will "get off to a slower start than most of us expected."

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COMPUTERWORLD

Issue: November 3. Closing: October 10.

Symbolics forecasts low profits, points to product transition

Symbolics, Inc. expects to report that revenue for its recently completed fiscal first quarter is substantially lower than the $31.7 million posted in the fourth quarter of fiscal 1986. Stating that it is too early to project precise revenue levels, the Concord, Mass.-based symbolic processor maker cited factors affecting business.

"The order level in the first quarter is traditionally weaker than the other fiscal quarters," President Russell Noftsker said.

"This seasonality, coupled with the effects of the product transition, the continuation of the overall slowdown in capital spending for computer equipment and the confusion in the marketplace related to competitive product offerings, will lead to significantly lower results in the quarter," he continued.

Symbolics does not expect business to improve until the third fiscal quarter, Noftsker added.

INDUSTRY NOTES

Continuing to revise the structure of its information systems business, **Gould, Inc.** has reorganized from two to three units and has appointed two new division presidents.

Named to head the mainstay Computer Systems Division was Patrick Richard, former executive vice-president, while Richard C. Baker, former Computer Systems development vice-president, is the new president and general manager of the Imaging and Graphics Division. Both report to C. Shelton James, who previously presided over daily operations of both units and remains as corporate vice-president of the Information Systems Group.

The firm has also elevated its Federal Systems organization to division status.

The new division, which will continue to market high-resolution graphics displays and workstations to the federal government and government contractors, will be comanaged in the near term by Patrick Pollak, vice-president of systems development, and Kenneth Weiss, senior director.

■

Cullinet Software, Inc. has signed separation agreements with certain employees that would take effect upon transfer of control of the company.

The Westwood, Mass.-based firm stated that it is not in discussions nor does it anticipate a change in control of the company but entered into the arrangement in "the best interest of shareholders." The software development firm did not name the affected employees.

■

Control Data Corp. has been awarded a contract to provide maintenance for users of **Novell, Inc.'s** networking products. Under the agreement, CDC's Engineering Services Division will provide field service and support for Novell customers on a nationwide basis.

■

Peat, Marwick, Mitchell & Co., the New York-based international accounting and consulting firm, has made an equity investment in public relations firm **Regis McKenna, Inc.** as part of a newly formed strategic alliance between the two companies. Neither firm would quantify the investment, saying only that Peat Marwick would gain "a significant minority ownership position."

■

Wang Laboratories, Inc. has settled a patent infringement suit filed earlier this year against **Wespercorp, Inc.** of Santa Ana, Calif. Wang had alleged that Wespercorp's DLP-4400 plug-compatible printer controller, which enabled third-party printers to be used in Wang WPS, OIS and VS systems, infringed on its patent for the Distributed Data Processing System.

Under terms of the out-of-court settlement, Wespercorp has agreed to cease manufacturing and marketing the printer controller.

Wespercorp will be allowed, however, to make an undisclosed quantity of DLP-4400s through September 1988 and will be permitted to repair installed units for as long as they are in service.

In lieu of a cash payment, Wespercorp will transfer DLP-440 technology to Wang.

The agreement also requires a consent judgment to be entered into Federal District Court for the Central District of California.

■

VM Software, Inc. has formed a new division to develop products for use with IBM's SQL/DS relational data base management system.

The Applied Relational Technology Division, which will operate as a specialized business unit within VM Software, expects to announce its first product in the first quarter of 1987.

■

Sterling Software, Inc. said it has completed the retirement of the $140 million debt incurred in acquiring Informatics General Corp. in 1985. Sterling repaid the final $67 million of the debt last month with the completion of a $115 million low-interest, convertible debenture financing. A corporate statement hinted that Sterling will soon return to its acquisition-minded ways due to its increased liquidity.

■

Oracle Corp. posted a profit in its first quarter, ended Aug. 31, for the second consecutive year. This upward turn ends eight straight years of reported losses for that quarter. The Belmont, Calif., relational data base vendor reported net income of $127,000, or 1 cent per share, a 14% increase from the previous year's $111,000, or 1 cent per share. Revenue grew 149% to $17.6 million during the quarter.

■

Advanced Micro Devices, Inc. named Tony Holbrook president. Holbrook, 46, was formerly executive vice-president and chief operating officer.

He takes over the president's title from W. J. Sanders, who will remain the company's chairman and chief executive officer.

■

AT&T has belatedly agreed to join **Japan ENS Corp.**, a Tokyo-based value-added network company that has been inoperative for more than a year.

Under the terms of the agreement, the U.S. telecommunications giant will invest $11.9 million and control half of the firm. AT&T's financial participation will double the capitalization of the 19-member company to $23.9 million.

Japan ENS was established last year by 18 Japanese computer and communications vendors and financial organizations to provide value-added network service based on AT&T's Net 1000 in Japan. The scope of planned activities, however, had been scaled back after AT&T announced plans to scrap the Net 1000 last January.

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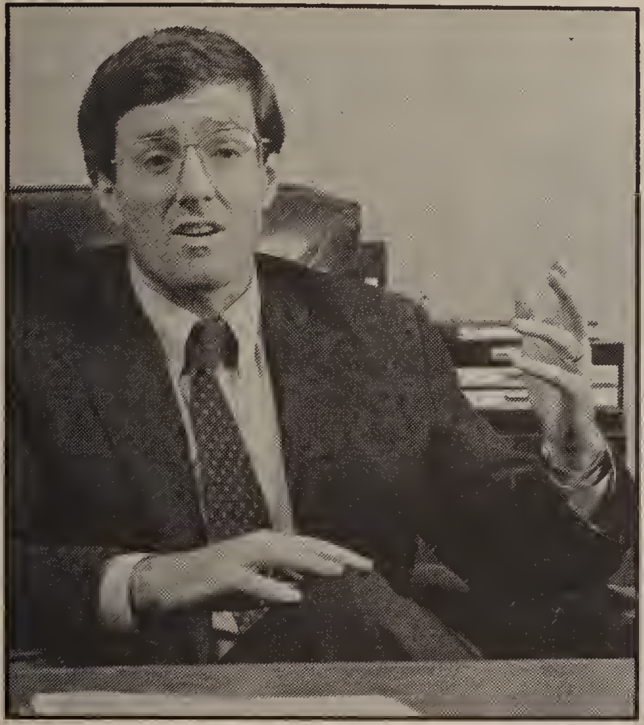

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NICKELS AND DIMES

Software AG Systems, Inc. announced revenue for the first quarter ended Aug. 31 of $15.4 million, compared with $16 million for the comparable period last year. Profits were $1.1 million, or 19 cents per share, compared with $2.9 million, or 49 cents per share, in the previous year.

■

3Com Corp. reported revenue for the first quarter ended Aug. 31 of $20 million, a 49% increase over $13.4 million in the like quarter last year.

Profits were $1.9 million, or 14 cents per share, compared with $1.4 million, or 10 cents per share, last year.

■

Micropro International Corp. announced revenue of $10.5 million and a loss of $342,000, or 3 cents per share, for the fourth quarter ended Aug. 31. This compares with revenue of $10.7 million and earnings of $1.2 million, or 10 cents per share, in the like quarter of the prior year.

For the year, the company reported revenue of $38.2 million and a loss of $1.2 million, or 10 cents per share.

This compares with revenue of $42.6 million and earnings of $207,000, or 2 cents per share, last year.

■

Micron Technology, Inc. announced revenue for the year ended Sept. 3 of $48.9 million, compared with revenue of $75.9 million in the previous year. Net loss was $33.9 million, compared with net income of $154,000 for the prior year. The loss per share was $1.75, compared with earnings per share of 1 cent in the previous year.

Revenue for the fourth quarter was $20 million, compared with $6.2 million for the like period a year ago. Net loss for the quarter was $5.8 million, or 29 cents per share, compared with a net loss of $7.3 million, or 38 cents per share, in the comparable period last year.

■

Adobe Systems, Inc. announced revenue for the third quarter ended Aug. 31 of $4.9 million, compared with $1.6 million in the previous year. Profits were $1.2 million, or 25 cents per share, compared with $438,000, or 10 cents per share, one year ago.

Contel, Comsat become partners

From page 182

ation with Intelsat.

Although Comsat reported net income of $28 million for the first half of fiscal 1986, some analysts expressed concern that the demand for satellite communications could be strongly diminished by the emergence of fiber-optic networks for voice and data transmissions.

The merger "was a very good move for Comsat, but I'm a bit concerned about Contel's expansion into this area," said Michael Kennedy, financial analyst with Gartner Securities Corp. in Stamford, Conn. "Comsat's market position was weak, and Contel could be getting into a risky business."

The Contel-Comsat merger could provide an "interesting parallel" to GTE Corp.'s acquisition of GTE Sprint Communications Corp., Kennedy said, adding that the GTE-Sprint union ended up costing shareholders more than $1 billion.

The merger could bring Contel and Comsat closer toward being a more complete data communications network vendor, some analysts say. "For those looking for systems integration, going to a vendor to get everything they need is important, and since the divestiture of AT&T, there really hasn't been anyone to do that," said Jeffrey Held, group manager for data communications at Network Strategies, Inc., a Fairfax, Va., telecommunications consulting firm.

"There's going to be a great market for firms that can do it all," Held continued. "This will bring Contel a step closer to fulfilling that need."

The Contel-Comsat union must be approved by both companies' shareholders, the Federal Communications Commission and governments within Contel's 30 states, but the announcement was met with immediate opposition. MCI is expected to challenge the merger before the FCC and the U.S. Department of Justice.

"Our complaint is that we compete in the long-distance international market, and in this merger, we would be forced to deal with Comsat's exclusive rights to resell Intelsat circuits," said William G. McGowan, MCI's chief executive officer. "And we don't mind Contel competing with us, but we do mind when the two are combined."

Analysts were not surprised at MCI's objections. "The merger will most likely involve some complex legal maneuvers throughout the next year," Kennedy said. "But the trend in the industry is toward consolidation, and the FCC and the courts have not really stood in the way."

As a result of the merger, Contel will gain Comsat's expertise in technology and research and development, while Comsat will inherit Contel's customer base and marketing savvy, according to Contel spokesman Ken Bomar.

John N. Lemasters, president and chief executive officer of Contel, will become president and CEO of Comsat. Charles Wohlstetter, chairman of Contel, will serve in that capacity for Comsat. Irving Goldstein, chairman and CEO of Comsat, will be named vice-chairman.

The combined assets of the company would be $6.6 billion.

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In fact, selected international market information is so scarce, Land is currently writing a guide entitled the *High-Tech Exporter's Sourcebook.* And he plans to continue relying on CW International Marketing Services for distributor contacts. He explains, *"The real added value of CW is its people and expertise in-place around the world."* He adds, *"Because CW Communications is a network of international offices, CW International Marketing Services has worldwide contacts and marketing information unavailable elsewhere."*

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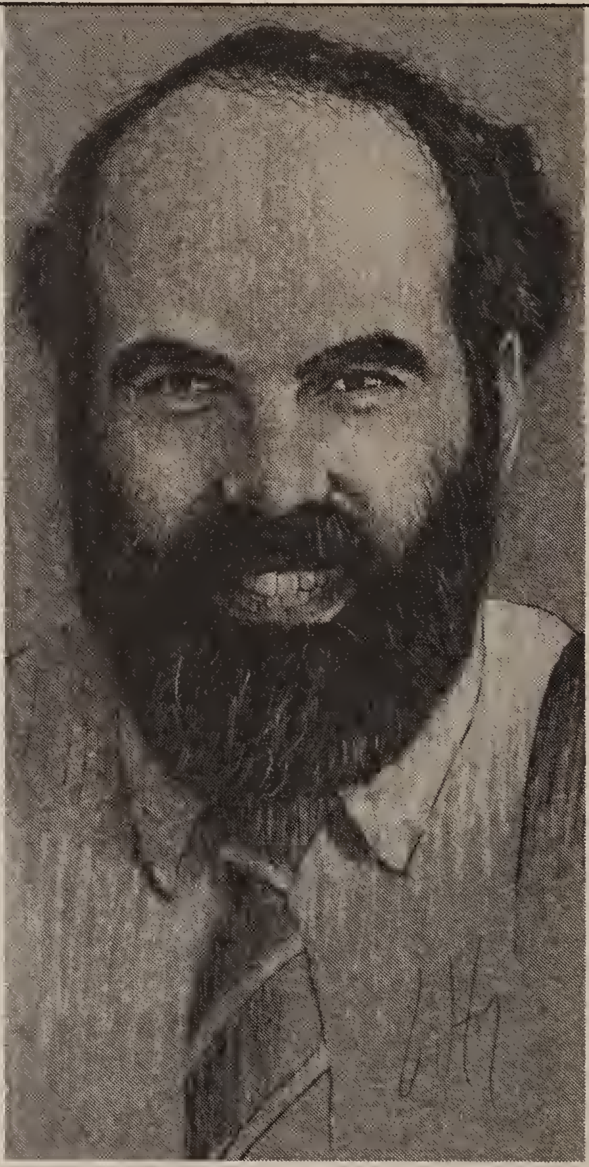

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Panic grips chip buyers

From page 182

have charged that the prices have been artificially raised, by a U.S. Commerce Department formula, to levels that are unreasonably high.

The truth, as is typical in such emotional debates, is somewhere in the middle. But the question remains, Can the U.S. government help the semiconductor industry without hurting the computer industry — and vice versa?

The answer is maybe. But not with its current approach.

Delving into metaphor for a moment, consider the global computer/semiconductor/electronics industry to be a newly formed stream coursing slowly down a gentle slope. The stream meanders around natural obstacles until it finds a smooth spillway where it can flow quickly — the geographic path of least resistance.

The industry stream's direction is controlled by factors like currency exchange rates, overall demand, production and labor costs, technological advances and users' needs. In this picture, the U.S.-Japan chip trade agreement is like a large boulder placed by the two governments to impede the stream.

The flow will in fact be blocked temporarily — in the form of currently inflated prices for dynamic random-access memory chips. But sooner or later, the stream will find ways around that boulder. In the case of higher chip prices, those diverted paths could well include shifting more systems manufacturing offshore or seeking memory chip producers who are not bound by the trade agreement — such as the South Koreans.

The vendors' outcry during the last few weeks over artificially high memory prices should be taken with a grain of salt. Chip prices have skyrocketed since the trade pact, but the systems vendors have overreacted in forecasting the ruin of the domestic computer industry.

More systems and component manufacturing will be headed for the Far East, but that trend began long before higher U.S. chip prices became a reality, and it will continue after they level off. Before demanding public sector action to alleviate the effects of the semiconductor trade agreement, systems vendors should realize that the government can only block the flow of the market. It cannot change its ultimate course.

> ”
>
> ***More systems and component manufacturing will be headed for the Far East, but that trend began long before higher U.S. chip prices became a reality, and it will continue after they level off.***

ADR names new president

From page 182

Bennett indicated that Strigl's talents lie primarily in his management experience, having built Ameritech Mobile Communications into a strong contender in the fledgling cellular phone market. "He also has more of a marketing focus, which is something we hope he will bring to the daily operations of the company," Bennett said.

Peter Levine, program director of the Gartner Group, Inc.'s software strategies group, said Strigl's arrival could signal a shift in Ameritech's handling of ADR. "They had maintained a hands-off position," Levine said. "This could be a change."

Kenneth Burke, an analyst with Alex Brown & Sons, agreed. "I think at some point this was naturally going to occur," he said. "I've heard, although haven't been able to confirm, that things are not going that well at ADR. Perhaps this is a way for Ameritech to get more control over what is going on there."

While some analysts might be inclined to believe Strigl's appointment reflects Ameritech's efforts to bring ADR into the corporate fold, Bennett emphatically declared that this is not the case.

Gartner's Levine noted that Goetz's return to the research and development lab reflects an ongoing transformation of leadership at the several major mainframe data base software firms.

"If you look at the founders of the big five in the traditional data base business, each is subtly stepping aside," he said. "For example, John Norris Maguire has given way to Stuart Miller at Software AG, and John Cullinane is giving up more responsibility to Robert Chapman at Cullinet Software. The ADR-Ameritech situation logically follows."

Before taking the helm at Ameritech Mobile Communications in October 1983, Strigl served briefly as Ameritech's marketing vice-president.

Richard C. Notebart, who had been vice-president of national marketing and operations at Ameritech Communications, Ameritech's national sales and marketing support unit, succeeds Strigl as president of Ameritech Mobile Communications.

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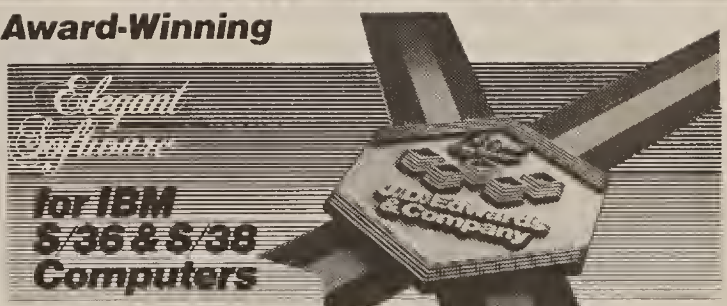

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900 Turks Head Building
Providence, RI 02903
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ROBERT HALF
of Oklahoma
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Oklahoma City, OK 73118
(405) 843-0800

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IBM-OS/MVS-IMS. Must have strong supervisory and management skills. Call or send resume. Never a fee to applicant. Salary to **$50,000**

ROBERT HALF
of Omaha
7171 Mercy Road
Omaha, NE 68106
(402) 397-8107

BOSTON

BANKING S/A

Leading growth-oriented fin'l svcs firm seeks astute tech analyst for banking sys devel. Previous IBM OS/MVS, COBOL & CICS req. Excellent oppty to lead hi vis apps devel proj in fast-track environ. Salary to **$38,000**

WANG VS COBOL

Exciting MIS dept of prestigious fin'l svcs leasing co seeks fast-track Wang VS COBOL P/A. Combine the latest in technology + prof growth up the MIS ladder. Great mix of PC's, development & technological challenge! Salary to **$30,000**

LEAD COBOL P/A

Dynamic BOSTON area mfr seeks tech skilled P/A for key devel role. IBM OS shop w/prof MIS grp offering fin'l/payroll/bus sys devel projs. Any MARK IV &/or DBMS a plus! Salary to mid **$30's**

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SYSTEM PROGRAMMERS

Several CT clients seek person to play key role in genning, supporting & modifying MVS opn sys. Excellent suburban loc's, growth situations, CICS/IDMS exp helpful. Salaries to **$42,000**

SYSTEMS MANAGERS

Manage the DES/DEV of on-line, interactive, data base sys in growing fin'l svc co. We have exclusive oppty's for talented, results oriented mgr's w/exp in portfolio mgmt, check processing, funds XFER & DDA apps. IBM bkgrd req'd. Excellent benefits, full relocation. Salary to **$65,000+**

PROGRAMMER ANALYST
SYSTEM ANALYST

HARTFORD area oppty's for P/A's & S/A's w/CICS & IMS or IDMS exp. Two+ yrs exp req'd for an oppty to work in state-of-the-art IBM environ & implement data base sys. Our client will provide data base training for qualified candidates w/ min 2 yrs COBOL. Excellent oppty for indiv's seeking growth & advancement. Paid reloc. Salary to **$37,000**

IDMS DBA

HARTFORD area suburban client seeks IDMS exp'd tech oriented indiv to join growing data base area. Lead the design of IDMS/ADSO based sys for this Fortune 100 co. Two+ yrs IDMS exp + desire for tech career req'd. Salary to **$46,000**

VM

Two CT oppty's for exp'd IBM/MVS/VM 'internals' indiv's to join corp staff at top tech planning respon's. Full relocation. Salary to **$42,000**

ROBERT HALF
of Hartford
111 Pearl Street
Hartford, CT 06103
(203) 278-7170

BUFFALO

S/38 PROJECT LEADER

Growing mfr in rural upstate NY has urgent need for Proj Leader to mge multiple software projs. Req min 3 yrs exp, strong S/38-RPG III bkgrd & excellent interpersonal skills. Co wants career oriented, stable prof. A great company! To **$35,000**

ROBERT HALF
of Buffalo
420 Main Street
1112 Liberty Building
Buffalo, NY 14202
(716) 842-0801

WISCONSIN

SYSTEMS PROGRAMMER

Here's a chance to expand your horizons as a local firm seeks 2+ years MVS experience, CICS and problem solving knowledge on an IBM 308x. Knowledge of JES 3 helpful. To **$37,000**

TECHNICAL SYSTEM ANALYST

It's time to use your talents to the fullest with this manufacturer who seeks 2+ years Burroughs, data base & network design experience. Knowledge of DMSII, NDL II and its operating systems a big plus. **$28-36,000**

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of Wisconsin
777 E. Wisconsin Ave.
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(414) 271-HALF (271-4253)

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Management Services div of major accounting firm seeks mgmt level indiv'ls. 2+yrs "BIG 8" experience. Manufacturing software pkg (Mapics, Copics) S34/36/38 and mainframe.

ROBERT HALF
of L.A.
3600 Wilshire, #2000
Los Angeles, CA 90010
(213) 386-6805

ST. LOUIS

TANDEM OPPORTUNITIES

Various positions exist in the St. Louis area for Tandem specialists that have either applications or systems programming background. Your 2+ years of TAL background or your COBOL programming experience will allow you to be considered for these challenging opportunities. Pathway exposure would be helpful. Salaries to **$40,000**

LEAD SYSTEMS ANALYST
S/38

Growing mfg in St. Louis is looking for a seasoned professional with thorough knowledge of the S/38. Will be an integral part of a new effort in establishing an automated design methodology tool for future systems design. This will be one of the most "involved" positions around. BS in Computer Science or Business Data Processing. Salary to **$40's**

MVS SYSTEMS PROGRAMMER

Expanding MVS shop downtown St. Louis is looking for an MVS Sys Prog to be the backup support for MVS and also do a great deal of VTAM/NCP and package installation/tuning. This position will let you get as technical as you like and reward you for it at the same time! Give us a call or send your resume. **$35,000**

ROBERT HALF
of St. Louis
7733 Forsyth Blvd.
St. Louis, MO 63105
(314) 727-1535

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Fast growing company seeks a programmer with 3-5 years experience using PL1 and COBOL. CICS required. IBM mainframe in a DOS/VSE environment. Financial applications a plus. To **$30,000**

ROBERT HALF
of Austin
400 East Anderson
Suite 334
Austin, TX 78752
(512) 835-0883

ASSOCIATE VICE PRESIDENT FOR COMPUTING

Indiana University of Pennsylvania invites applications for the position of Associate Vice President for Computing, which is a new position.

IUP, the largest institution in the Pennsylvania State System of Higher Education, has an enrollment of approximately 13,000 on its main campus and two branches. The University has six colleges and two schools. IUP employs over 1,400 full-time employees including a faculty of approximately 700. Located 50 miles northeast of Pittsburgh, IUP is situated in the foothills of the Allegheny Mountains within a community of 20,000 residents. The University has been identified as a University which offers quality undergraduate programs at a very reasonable cost and has selected graduate programs including five doctoral programs largely in applied areas. IUP has an excellent faculty and an able, enthusiastic and responsible student body.

The Associate Vice President for Computing is a senior-level position reporting to the Vice President for Finance, is responsible for providing leadership and coordination of computing services to support the academic, research and administrative needs of the University. This position is responsible for planning; developing and recommending, and executing policy; establishing and improving procedures; delivery of computing support services and management of the University's Information Systems and Communications Center. The Associate Vice President will work cooperatively with the Vice Presidents, Academic Deans and other administrators providing guidance and advisement on computing activities.

A bachelor's degree in Management Informations Systems, Computer Science or equivalent is required. A graduate degree on the Master's level in MIS or equivalent is preferred. A minimum of 8 years of progressive experience in academic and/or administrative computing is required, with preference given to applicants with demonstrated experience in an educational environment. Applicants must be capable of managing and motivating professional employees, possess leadership qualities, communication skills and work effectively to administer the diverse computing needs of faculty, staff and students.

Salary is competitive, with an excellent fringe benefit program. The appointment date is January, 1987, or as soon thereafter as possible. Review of applications will begin on October 20, 1986, and continue until the position is filled. Nominations and applications, complete with resume and names of three references should be sent to: Dr. Mark Staszkiewicz, Chairperson, Search Committee, Associate Vice President for Computing, 203 Sutton Hall, Indiana University of Pennsylvania, Indiana, PA 15705.

IUP is an affirmative action/equal opportunity employer.

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4725 Scottsdale Rd, Suite 209
Scottsdale, AZ 85251
(602) 274-6666

PACIFIC NORTHWEST
Houser, Martin, Morris & Assoc.
P.O. Box C-90015
Bellevue, WA 98009
(206) 453-2700

CALIFORNIA
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DIRECTOR-SCIENTIFIC COMPUTING

The National Center for Atmospheric Research (NCAR) invites nominations and applications for the position of Director of the Scientific Computing Division (SCD). SCD's complex computing environment ranges from personal computers to supercomputers with access by local and remote users via dial-up telephones, leased lines, private data networks, internetworking and satellite communications. SCD supports the computing needs of the theoretical and applied atmospheric researchers, totaling more than 1000 users at 100 institutions, with a staff of approximately 100 and an annual operating budget of about $14 million.

The Director ensures the productivity, creativity and excellence of the services provided by SCD; formulates and executes both long and short-range plans; oversees the operation, management and development of the division, and ensures that SCD plays an optimum role in the context of a national computing effort in the atmospheric, ocean and related sciences. As a member of the NCAR management team, he/she actively participates in NCAR strategy, policy and administrative matters.

REQUIRES: PhD in atmospheric or related physical science, engineering, mathematics or computer science, OR the equivalent combination of education and experience; demonstrated understanding of the effective management and direction of a complex research enterprise; demonstrated leadership skills; skill in working with peers, internal and external, in planning and negotiations; skill in directing and evaluating staff; skill in effective resource utilization and planning; and strong communication skills.

We offer an excellent fringe benefits package, including a tax-deferred retirement program and relocation assistance. Please submit letter of interest/nomination and resume to:

Ms. Valerie Friesen
Director of Personnel and EOP
P.O. Box 3000, Boulder, CO 80307

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Out of your 5-7 years experience in software systems/applications development or application service delivery, you've spent 2-3 years managing multi-people software projects. You must have a college degree, preferably in Computer Science, or the equivalent. Your technical competence and excellent verbal/written communication skills allow you to commmunicate with software engineers at a detailed level and with customers at a high level. Knowledge of an engineering development process is highly desirable.

Senior Application Developers

You'll need a college degree, or the equivalent, plus 5-7 years experience developing software applications, 2-3 years experience using VAX/VMS* and VAX-layered software, and 1-2 years experience developing ALL-IN-1 applications. Other desirable experience would include RDB, RALLY, VTX and experience in developing applications using PC-DOS or MS-DOS**.

Application Developers

After you received your college degree, or the equivalent, you have spent 3-5 years in developing application software or application service delivery. 2-3 years programming experience with VAX/VMS and VAX-layered software products such as DATATRIEVE*, DECgraph*, DECalc* and FMS* is highly desirable. And of course, application development using ALL-IN-1 is a strong plus.

Systems Engineers

Of your 4-7 years experience in developing software systems, at least 3 should include experience writing software using BLISS, MACRO, PASCAL or 'C'. Additionally, you should have 2-3 years experience programming on VAX/VMS systems. Knowledge of office or business systems, experience with PC-DOS or MS-DOS programming, and knowledge of either RDB, DBMS, DECnet* or DASL are also highly desirable qualifications. A college degree in Computer Science, or the equivalent, is required.

Technical Writers

In your 3-5 years of experience in writing both user and technical documentation for software systems, you've developed expertise in comprehending and communicating complex technical concepts. In addition to a college degree in English or Writing, or the equivalent, you should have a minimum of 1-2 years experience using computers—word processors, editors, text processors and the like.

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```
begin
 PAGE( OUTPUT ) ; GOTOXY(
 WRITE( 'Enter command prog
 GOTOXY( XORIGIN, YORIGIN
 RESET( COMMAND, LINEIN ) ;
 with COMMAND^ do
  for NPX := 1 to CSIZE do
   begin
   GOTOXY( XORIGIN, YORIGIN
   WRITE( LLE NPX ] ) ; LE
   end ;
```

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Exploring has never been easier

Firms participating in the Conference represent a broad cross section of user, consulting, vendor and service organizations. They are diverse in industry, size and location, and range from the dynamic new start-up to the larger well-established, growth-oriented company. Compensation levels are outstanding.

In all, over 6,000 specific positions are represented. The Conference offers you a convenient way to investigate a wide variety of career options – all in complete confidence. There are no forms to fill out – nor is a resume necessary. You will meet only those firms that you are interested in – or that have interest in you. Discussions will be held in strict privacy, at a time and day that's most convenient for you.

How to participate

The Source Edp Computer Career Conference is scheduled in a city near you soon. There is absolutely no charge for your involvement or attendance since participating client companies will assume our fees. And, all inquiries are held in strict confidence.

To ensure your reservation and to learn about Conference dates in your area, call Dave Grinnell today at 1-800-821-7700, Ext. 800B. Our lines are open from 8 am to 8 pm everyday, or write:
David C. Grinnell, Career Conference Director,
Source Edp Headquarters, Dept. 7021,
P.O. Box 7100, Mountain View, California 94039.

Following is a summary of the kinds of positions and compensation offered.

Applications Programming
$23,000 – $54,000

Those with two or more years' experience in applications programming will have an opportunity to learn new skills while ensuring maximum compensation. Positions exist in environments ranging from the largest scale mainframes through mini and microcomputer user, consulting and vendor firms.

Positions are available using a variety of languages including COBOL, PL/1, Assembly, RPGII, PASCAL, "C" or BASIC; operating systems like OS/MVS, VM/DOS/VSE, UNIX, AOS, and data base and data communications like IMS, CICS, INFOS, TOTAL, IDMS, ADABAS, System 2000, ADDS-0 and more. Significant opportunities exist for those with solid programming backgrounds to move into systems development, software, EDP auditing or systems evaluation.

Software Development/ Software Engineering
$28,000 – $60,000

Individuals with two or more years of software design and development or software engineering experience will be able to gain experience and develop some or all of the following: operating systems, capacity planning and performance enhancement tools (OMEGAMON, MEAGAMON), compilers (C, PASCAL, ADA), I/O and device handlers and program generation tools. This development work will take place on a variety of systems including IBM 3083's, VAX 11/780's, Tandem Non-Stop, and variety of other mini and micro systems (Motorola 68000, Intel 8080's).

Many of the companies participating in the Conference offer formal training and experience in leading-edge technology as well as day-to-day contact with some of the top technical professionals in the country. A number of opportunities with new venture companies offer exceptional growth and equity potential.

Data Base/Data Communications
$25,000 – $55,000

Many openings exist for individuals with backgrounds in database and/or data communications. Exposure to a variety of technologies is possible, including: IMS DB/DC, ADABAS, IDMS, TOTAL, FOCUS, CICS, DECNET, NATURAL, TASKMASTER, ENVIRON/1, TCAM/NCP, SDLC, SNA, X.25 and other database and/or data communications software.

Companies participating in the Conference include major computer and software manufacturers, Fortune 500 companies, prestigious consulting firms as well as many emerging high technology firms.

Systems Programming
$24,000 – $55,000

Opportunities provided by client firms that are participating in the Conference are broad and unique. Those with at least one year of systems programming experience will be able to strengthen their skills as well as gain knowledge of some or all of the following: UNIX, CPM, CICS, IMS, OS/VS, DOS/VS, ADABAS, DL/1, modems, duplex lines, switches, and more in both mainframe and mini or micro environments. Assignments range from program development and enhancement to systems support.

EDP Auditing
$25,000 – $58,000

Exploding opportunities exist in EDP auditing. There are many openings for those professionals who have a good technical background in programming or design plus exposure to accounting applications. Large firms are expanding their EDP auditing departments and are providing specific training in auditing for Programmer/Analysts – particularly those with over two years experience.

Technical Writing
$21,000 – $38,000

Those Technical Writers/Documentation Specialists who have writing experience with state-of-the-art hardware and software are now in a position to capitalize on those skills due to high demand. Positions range from creating technical documents for users to the development of marketing and sales brochures for new products. Because of the growth of new hardware products and new software packages, the need for good technical writers has grown rapidly. In addition to a great need for creative writing, there are also many opportunities for the more senior level writers to become Technical Writing/Documentation Managers.

Systems Development/ Consulting Management
$31,000 – $78,000

A broad variety of openings exist for persons with systems design and development backgrounds ranging from systems analysis to senior project management and/or management consulting. Many leading-edge communications and data base-oriented information systems projects are being planned by Conference client firms. In addition, a number of small to intermediate size firms are just beginning to make their initial thrusts into computing – especially in mini/micro areas – and need new applications development expertise. Several nationally-respected management consulting firms will also be represented for those persons who are interested in a variety of new development assignments with high visibility to corporate management.

Sales, Marketing and Technical Marketing Support
$23,000 – $108,000

Those professionals who attend the Conference will learn about new opportunities in computer sales, marketing and marketing support. Many alternatives exist in various product areas including mainframes, mini/microcomputer technology, terminal systems, time-sharing, facilities management, proprietary software packages, OEM's, consulting and more. Many firms are just now entering new markets and will provide exceptional career and compensation growth potential – as well as equity participation.

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One of the largest wastewater processing facilities in the western U.S., located in southern California, seeks a dedicated, enthusiastic professional to fill the newly-created position of Computer Systems Engineer in our Huntington Beach facility.

The successful candidate will be responsible for the operation and maintenance of a highly sophisticated process computer, the Cyber 18-20. This system is designed to provide and compile real time operating data, as well as randomly inserted data, graphic displays, trend plotting of data, alarm summaries, data displays and reports of the plant processes. This position will act as direct supervisor to all personnel involved in computer based operations. Must be capable of applying engineering principles and techniques in the solution of difficult and complex problems related to the design and implementation of large scale computer network monitoring systems. Familiarity with telemetry systems a must. In addition, this individual will be required to prepare comprehensive technical reports and related manuals. Will submit recommendations regarding operations based on analysis of existing system and procedures.

This position requires a B.S. degree in computer science or academic equivalent. Must possess practical knowledge of engineering principles and practices. In addition, we require 4+ years of related experience. Supervisory experience desirable. Familiarity with the operations of wastewater treatment plants a plus.

We offer an outstanding benefits package which includes a 3-day weekend every other week and a company-matched deferred compensation plan. Final filing date: October 31, 1986.

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(714) 962-2411, ext. 238

ASSISTANT DIRECTOR PLANS & BUDGET

West Virginia Network for Educational Telecomputing, the statewide computer network for higher education in West Virginia, is located in Morgantown, WV. A community of 50,000 and home of West Virginia University, Morgantown is just 70 miles south of Pittsburgh, PA. The Assistant Director for Plans & Budget will assume full responsibility for performance monitoring and capacity planning; short and long range planning; marketing of services; budgeting and financial management; and will participate at the executive level in determining directions and policies for the entire organization. This position reports to WVNET's Director and heads a staff of 13. Host site configuration includes an IBM 3081GX32 running MVS/XA with JES2, OBS WYLBUR, CICS and ADABAS; an IBM 3081D16 running VM/SP release 4 with CMS and SPIRES and four DEC VAX 11/780's supporting interactive timesharing under VMS level 4. Distributed processing is provided by the host site facilities and remote system, which include a fifth VAX 11/780 and 12 PDP 11/44's which run under RSTS/E and provide batch and interactive computing as well as RJE access to the host site system. Minimum qualifications: Master's degree and 5 years experience in a computer center setting or an equivalent combination of education and experience. 2 years management experience. Extensive knowledge of the Principles of computer performance management and operating systems. Knowledge of statistical techniques, including simulation and forecasting. Strong analytical and problem solving skills. Previous experience in planning, budgeting and financial management. Salary low 40s plus excellent benefits. Apply by October 31, 1986 to Personnel Manager, WVNET, 837 Chestnut Ridge Rd., Morgantown, WV 26505, (304) 293-5192. An Equal Opportunity Employer.

SYSTEMS TECHNOLOGY MANAGER

(VAX SYSTEMS PROGRAMMING)

Computer Dept. of N.J.'s largest P.M. daily newspaper seeks a manager of Systems Technology. Position requires 10 yrs. exp. with 2-3 yrs. in active management with a large VAX System in a cluster environment. Will be responsible for the supervision & coordination of Systems Technology staff to include Systems Programming & Production System Support. Among responsibilities are evaluating & recommending, developing & implementing new software & hardware systems; resolving problems that arise on computer systems. Will direct the training of programmers, operators & users in the use of software systems & the counseling of user departments in specifying & selecting software. Also, will have responsibility for monitoring & tuning existing systems. Salary commensurate w/exp., excellent benefits program featuring two profit-sharing plans; 100%-125% tuition reimbursement plan. By appointment ONLY. Please call (201) 646-4023.

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KEYSTONE DATA SERVICES, INC
P.O. Box 1783
Altoona, PA 16603
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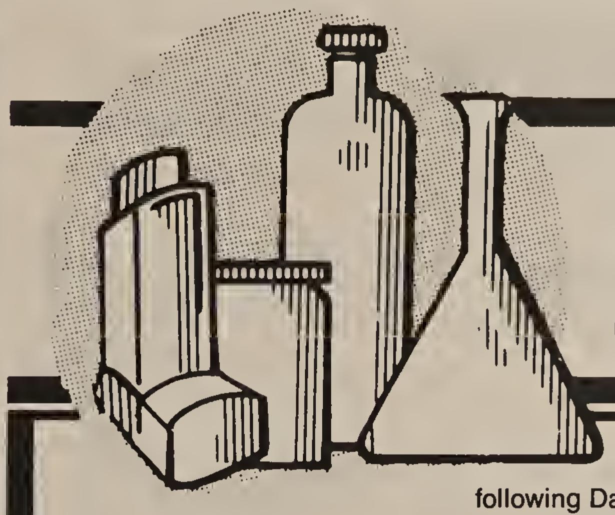

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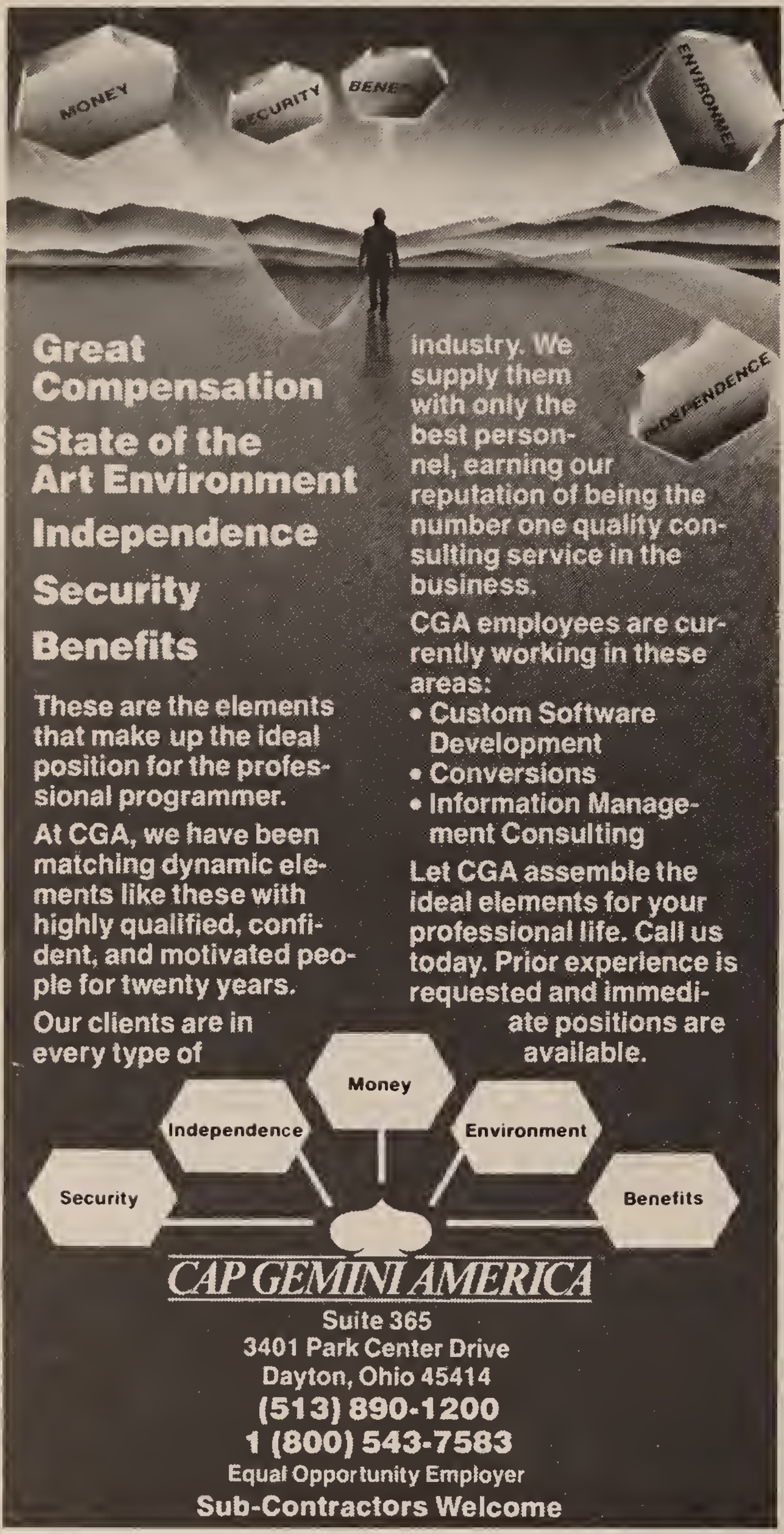

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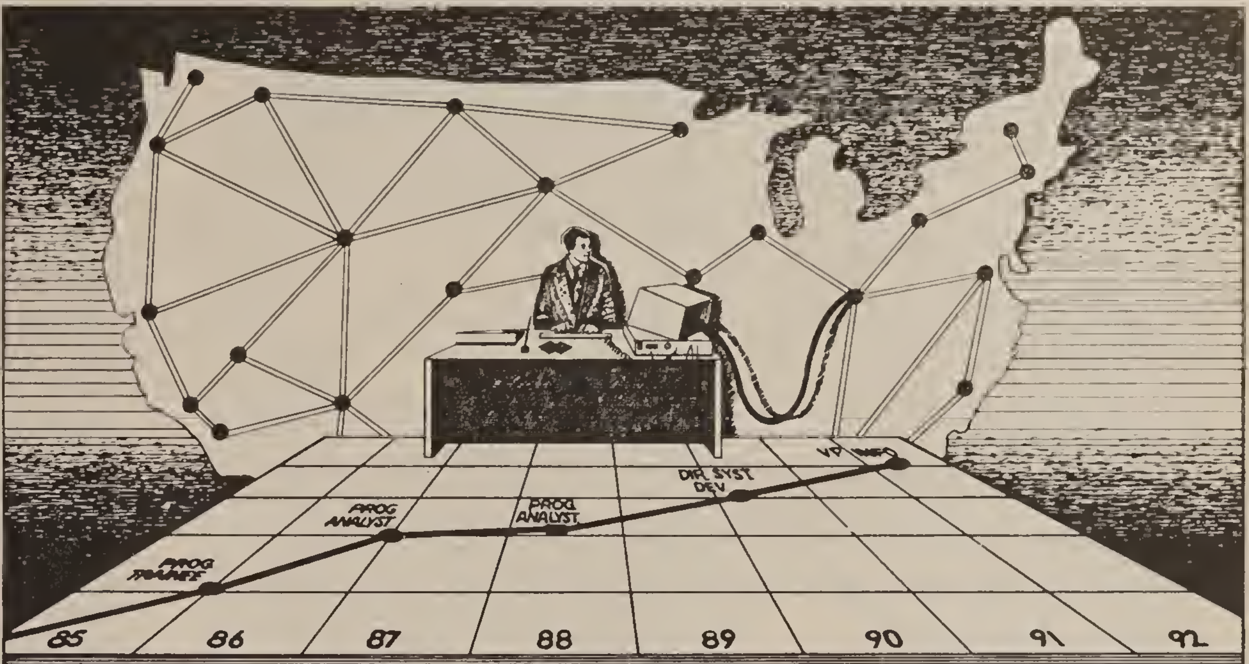

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Time-sharing adds features

From page 1

ton-Evans Research Co., an Ellicott City, Md., consulting firm, shows the current $3.6 billion remote computing market is declining and may never surpass the high-water mark it attained just prior to the advent of the PC. The report predicts the market's downward trajectory to continue at a rate of 5% through 1990.

"The dawn of the micro really put a crunch into the industry," says Chuck Newton, president of Newton-Evans Research. The proliferation of PCs, price drops for hardware, raw CPU power and storage and the wide choice of packaged software have eliminated much of the need for off-premises computing power, he adds.

But for Nisenson, the use of a mainframe and an approved program is required by the Nuclear Regulatory Commission's (NRC) quality assurance program. CDC keeps track of changing NRC requirements and frequently updates the program, which is periodically reviewed by the NRC.

High quality

"The quality is high," Nisenson says. "It's more cost-effective to leave it to them, rather than to do it on our own mainframe and update it ourselves," he adds.

"When you change something in the nuclear plant's design, you have to demonstrate it will work," Nisenson continues. If a new valve is to be installed in place of an old one, for example, an engineer needs to know if the existing pipes can tolerate forces generated by the new valve design, he explains.

Four years ago, Virginia Power began using CDC time-sharing to test its power plants for structural fitness. Gradually, however, the public utility acquired micros and experimented with them to test engineering software packages. The micros presented themselves as a clear alternative to time-sharing and, had CDC not offered a micro-based engineering program, the utility might have drifted away from CDC altogether.

But, observing the path that Virginia Power and others were following, CDC began to offer an engineering software package for the IBM Personal Computer that would work with CDC's remote supercomputer for structural testing and analysis. A year ago, Virginia Power had a $100,000-per-month time-sharing bill with CDC. Now that bill is only $50,000, but without the CDC PC package, it might have been zero.

Nisenson also praises the PCs, which allow more cost-effective computing than was previously possible.

"You can do 'what-if' scenarios on a PC without spending a lot of money," he says. But the ease of access that is possible with PCs means a corresponding lack of security, something that is the strong suit of a remote mainframe, Nisenson points out.

For CDC, the answer to keeping time-sharing customers has been to assimilate, rather than reject, micros and minicomputers.

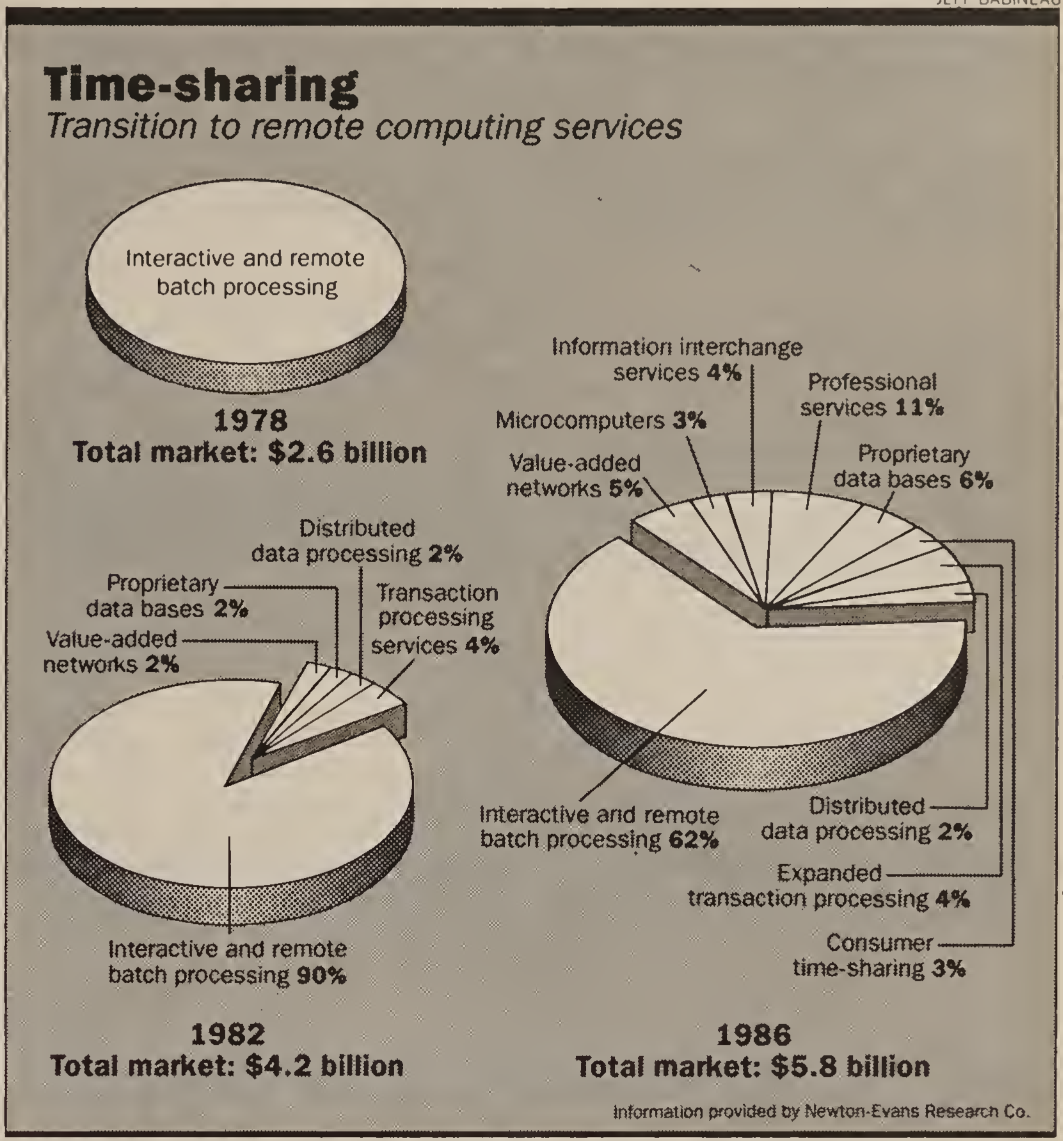
"Our posture will be to embrace the departmental processor. CDC has taken the direction of emphasizing supercomputing at the high end," says Steve Lewis, manager of product marketing of distributed data processing at CDC.

"I think there will be various tiers of computing — classes of problems will keep pushing computing horizons back. For example, biotechnology is still too complex for supercomputers," Lewis says.

As an expression of faith in shared supercomputing, Lewis says CDC is in the process of acquiring a Cray XMP 24 and CDC's anticipated successor to the Cyber 205 supercomputer to add to their Cyber 205 and two Cray 1s.

According to Newton, supercomputer time-sharing services are growing at a rate of 40% a year, a rate that slows but does not reverse the overall industry decline. The growth rate for supercomputer time-sharing will continue above 20% per year through 1987, Newton says.

JEFF BABINEAU



Information provided by Newton-Evans Research Co.

"In my opinion, you're going to see more of that happening. When you get into areas like computational fluid dynamics, you need a supercomputer," says Bart Patel, president of Creare, Inc. of Hanover, N.H.

Creare created Fluent, a program that examines the flow fields around objects in air or water. In addition to selling its own program, Patel designs state-of-the-art fluid dynamics programs for the government. Although he owns Digital Equipment Corp. VAX minicomputers, he time-shares a Convex near-supercomputer through Solution Systems, Inc.

Solution Systems' use of a Convex C1 computer and 9.6K bit/sec. dial-up communications demonstrates a small company's effort to stay afloat in a shrinking time-sharing market by offering faster speeds.

"Most companies charge about $20 per hour at 1200 baud. We charge $36 per hour at 9600 baud. That's eight times faster at less than two times the price," Neil Kleeman, president of Solution Systems, says.

Kleeman has strong opinions about the decline of time-sharing providers, pointing to the intrusion of micros as only part of the problem. "The reason time-sharing got burned is that people felt companies were out for all the money they could get this month, and to hell with the future." He recalls that when he worked for a time-sharing company, "the best thing that could happen was that the customer made a mistake and would have to do the work over again."

But while Patel and Nisenson use new time-sharing offerings, Hanan Liu of Serono Labs in Randolph, Mass., has virtually abandoned time-sharing because he is now able to accomplish tasks on his Personal Computer AT. Time-sharing assisted Liu in his move away from it.

Liu, who does statistical analysis of clinical testing data, began by using an SAS Institute, Inc. software package through Boeing Computer Services Co. Later, he began to use part of the program that was adapted by SAS to run on a PC, while still performing statistical analysis on a supercomputer. Then in April, 1986, SAS introduced the program's statistical analysis component for PC ATs, and he has not used the time-sharing service since, although he still maintains his account with Boeing, he says. "It's slower on the PC but cheaper," Liu says.

Digital Communications Associates, Inc. (DCA) of Alpharetta, Ga., makers of the Irma board micro-to-mainframe link, used IBM time-sharing to design its product, according to Pepper Bernhardt, software engineer for DCA.

DCA found that mainframe time-sharing was helpful for a time but now plans to eventually phase out its use of time-sharing as Serono Labs did. In designing the Irma board, DCA "needed to get up a mainframe screen," Bernhardt says, but couldn't afford to buy a machine and license the software.

"It is good when you are starting out. You can try out software," Bernhardt says, indicating that DCA spent $3,000 to $4,000 per month at first. Eventually, however, the monthly time-sharing bill ballooned to $30,000 per month. DCA now plans to move all computing to two in-house mainframes.

Total eclipse unlikely

But despite time-sharing's current uphill struggle, few predict the industry's total eclipse.

Marty Gruhn, vice-president of the Sierra Group, a market research firm in Tempe, Ariz., says the advent of Integrated Services Digital Networks will help time-sharing by allowing easier logon with many information providers, thus encouraging more use of remote services.

Gruhn goes on to predict the new time-sharing realms such as supercomputing will be more robust than old-fashioned time-sharing was in its heyday. Future time-sharing providers will furnish peak computing power as well as information or an updated program, the consultant says. "There is a massive market for that over time," she adds.

Declining revenues spur National Data to sell time-sharing division

By James A. Martin

ATLANTA — National Data Corp. said it has sold its unprofitable Rapidata Division, a computer time-sharing business, to Electronic Data Systems Corp. (EDS) of Dallas for an estimated $4 million to $6 million.

"We constantly evaluate our operations, and in recent years we have focused on the services we feel have the greatest growth potential," said Jack Kucera, director of corporate communications for National Data.

"With that in mind, we decided to prune the Rapidata division," he added.

Rapidata revenue was $11 million or $12 million in fiscal 1986, down from about $18 million in 1985 and $23 million in 1984, according to Chris Mortenson, senior analyst with Alex, Brown & Sons, Inc. in New York. National Data does not not release income and earnings figures for its divisions.

"It was a very smart and necessary move on National Data's part," Mortenson said. "The revenues from that business were declining, and management had done a good job of cutting costs, but they were at a point where they couldn't cut any further."

EDS, Mortenson added, "is probably one of the best companies in its business, and if anyone can turn Rapidata around, they have a good shot at it."

Rapidata performs time-sharing computer services for some 250 customers. It is expected that EDS will fully integrate Rapidata into its Demand Services Division, with no lay-offs anticipated, according to Kucera.

National Data and EDS did not disclose the value of the transaction.

Intelligent Systems for sale

Effort undertaken to boost market value

By James A. Martin

NORCROSS, Ga. — Intelligent Systems Corp. said last week it plans to put itself and all its independent operating units up for sale in an effort to increase the market value of the company.

Intelligent Systems has retained Bear, Stearns & Co. to help it find potential suitors. Intelligent Systems, the parent company of Quadram Corp., Princeton Graphic Systems, Inc., Peachtree Software, Inc. and Datavue Corp., said it will consider selling the company as a whole or spinning off individual sectors.

The total value of Intelligent Systems is greater than its stock market value, and the company has "adopted this course of action to realize for the shareholders greater value for their holdings," said J. Leland Strange, president and chief executive officer.

The day after the company's announcement, Intelligent Systems stock rose $2 a share to $7.75.

Analysts reacted favorably to the news. "We're happy with the idea. We had been recommending their stock for the last few months, but the company has been very dissatisfied with the stock performance," said David M. Guthrie of Morgan Keegan, Inc.

The company has been expected to spin off its Asher Technologies, Inc. communications product division to a California-based investor group and to sell approximately 40% of Princeton Graphic Systems in a public offering [CW, Sept. 22].

But Intelligent Systems spokesmen said last week it was premature to discuss negotiations, and analysts said that all talks would be kept highly secretive.

Digital Research to form connectivity software unit

By Jeffry Beeler

MONTEREY, Calif. — Digital Research, Inc. today is scheduled to announce the formation of a wholly owned subsidiary to produce interconnectivity software for micros, minicomputers and mainframes.

Interconnexions, Inc. is slated to introduce the first of its planned networking programs within six to nine months, according to John Hiles, president of the subsidiary.

The subsidiary represents the first move into communications software for Digital Research, which pioneered the CP/M and GEM operating systems for Apple Computer, Inc. micros.

Digital Research appears to be diversifying after a tumultuous period that included top management changes, trimming its work force by half, resolving a copyright dispute with Apple and selling 25% equity in the company to Northern Telecom, Inc. and Motorola, Inc.

Initially, Interconnexions will focus its attention on developing connectivity software tools, both generic and customized, for OEMs. Within 12 to 18 months, the company expects to supply similar kinds of connectivity tools directly to large end-user organizations, he added.

Steering clear of projects

Digital Research contends that users have traditionally steered clear of interconnection projects that required large investments of expertise and resources. Instead, they have preferred to defer the jobs until the necessary communications technology became available commercially, according to Hiles.

This reluctance by users to tackle difficult networking efforts on their own created an opening for Digital Research to launch Interconnexions, Hiles said, citing the advent of standards and the recent introduction of IBM's connectivity software.

"We now have a framework within which to construct tools that provide useful interactions between the three classes of computers," he said.

Estimates reveal low quarterly earnings for IBM, DG, Wang

ACTIVE ISSUES
Kathy Porteus

The quarter ended Sept. 30 proved tumultuous for technology stocks. But what should one expect from the companies themselves as they begin reporting quarterly results?

"Intel's quarter will reflect part seasonal weakness and part income statement cleanup," says Paul Johnson, analyst with L. F. Rothschild, Unterberg, Towbin. According to Johnson, Intel Corp. (INTC — 19¼) will take a $45 million write-off, bringing its quarterly loss to 70 cents per share. On a pretax basis, Intel's loss is 35 cents per share, Johnson estimates, compared with a pretax loss of 17 cents for June's quarter.

Johnson also estimates that Advanced Micro Devices, Inc. (AMD — 15⅝) will report a loss of 50 to 60 cents per share, not including a charge of $15 million to $20 million that last week the company announced it would take. On the other hand, Johnson estimates that Motorola, Inc. (MOT — 36⅞) will earn 35 to 40 cents per share, and Texas Instruments, Inc. (TXN — 111¼) will report a 50-cents-per-share profit.

"Everyone is moving sort of on cruise control," Johnson says. "Steady as she goes, and let's hope some wind comes up soon."

News on other technology fronts is also mixed. Stephen Smith, a computer analyst with Paine Webber, Inc., estimates Digital Equipment Corp. (DEC — 90) will earn $1.30 to 1.35 per share and Prime Computer, Inc. (PRM — 19¾), 30 cents vs. 32 cents per share a year ago.

However, Smith says he recently cut or is considering lowering quarterly estimates for IBM (IBM — 134¼), Data General Corp. (DGN — 27⅝) and Wang Laboratories, Inc. (WANB — 13). He now estimates IBM will earn $2 per share, a view also held by Michael Geran, an E. F. Hutton & Co. analyst.

Smith says he is considering lowering his pretax estimate for DG to 15 to 25 cents from 30 cents per share. For its September quarter, however, DG will be taking a one-time charge equaling $1.10 per share, owing to the recent settlement of a lawsuit from Fairchild Semiconductor Corp.

Smith says he is becoming concerned that Wang's results may be closer to break-even, with the risk of a loss, than to his current estimate of 10 cents per share.

Geran estimates Burroughs Corp. (BGH — 69¼) will earn 88 cents per share vs. 71 cents during last year's third quarter. "The sleeper of the year may be Burroughs," Hutton's Geran says. "Its merger with Sperry may not be as bad as some people thought."

For other BUNCH companies, Geran estimates Control Data Corp. (CDA — 25⅝) will earn 15 cents per share vs. a loss of $6.65 a year ago; NCR Corp. (NCR — 46⅛) will post earnings of 80 cents per share; and Honeywell, Inc. (HON — 71¼) will earn 55 cents per share vs. $1.24 for the same quarter last year.

David Readerman, software analyst with Smith Barney, Harris Upham & Co., estimates Management Science America, Inc. (MSAS — 11¾) will report between break-even and a loss of 15 cents per share, and troubled Cullinet Software, Inc. (CUL — 7) will post a loss of 16 cents per share for its current quarter ending Oct. 30.

Micro software companies should fare better. Readerman estimates Lotus Development Corp. (LOTS — 37½) will earn 52 cents compared with last year's 39 cents per share. He also forecasts Microsoft Corp. (MSFT — 28¼) will earn 29 cents per share, and Ashton-Tate (TATE — 28) will earn 53 cents per share for its October quarter.

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

Wang teams up with Sun, Apollo

From page 182

have a major presence.

"This puts us in a position to better compete with DEC and IBM," said Angelo Guadagno, vice-president of North American sales at Apollo. "In many accounts you have Wang in one area doing office automation and Apollo in engineering. That's been a weak spot for us, because DEC can come in and branch out both ways."

Kahana said the integration products are under development at Wang, but he could not say when the products will be introduced. The software, he said, will allow Sun or Apollo users to run Wang applications on a Wang Office window displayed on the workstation.

In the future, Wang plans to implement the Sun Network File System, a software program that allows files to be transmitted in a multivendor computer environment. The company also plans to offer support of the Apollo Domain system.

In an unrelated announcement, Apollo said last week that Boeing Computer Services Co. had signed a $20 million purchase agreement under which it will acquire both low- and high-end systems from Apollo over the next two years.

The order, the largest in Apollo's history, should further boost its sales, which the firm recently said would exceed $100 million for the third quarter ended Sept. 30.

IBM Credit gets new leader

By Clinton Wilder

ARMONK, N.Y. — IBM last week changed the helm of its highly successful leasing subsidiary, naming Harry L. Kavetas president of IBM Credit Corp.

Kavetas replaces David A. Finley, who was named treasurer of IBM. Under Finley's presidency since 1981, IBM Credit grew to surpass the $500 million revenue mark last year while posting profits of $103 million.

Kavetas, a 25-year IBM veteran, has been an IBM assistant controller since 1980. He has held financial positions with several IBM divisions, including general business, IBM world trade, data processing and federal systems.

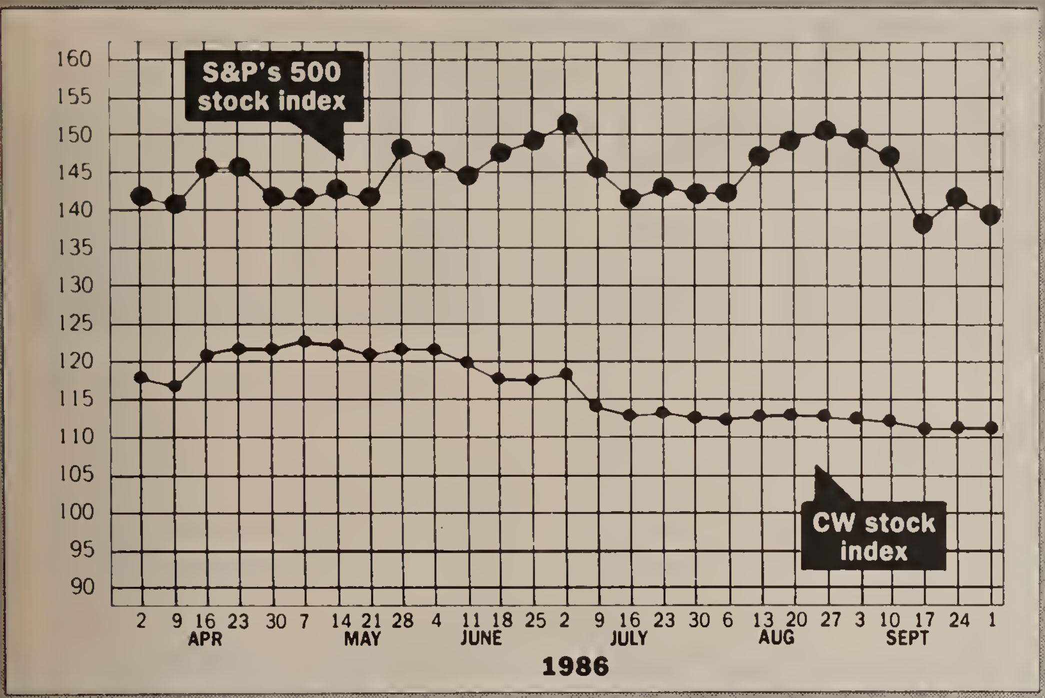
The management change comes at a crucial time for IBM Credit as well as for the leasing industry as a whole.

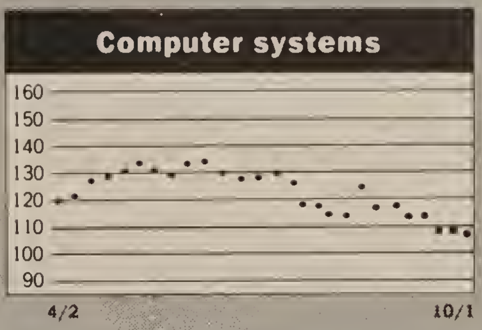
While thousands of five-year mainframe leases written by IBM Credit in 1981 are expiring, the industry is grappling with the effects of the investment tax credit repeal, which diminishes much of the financial incentive for leasing computers.

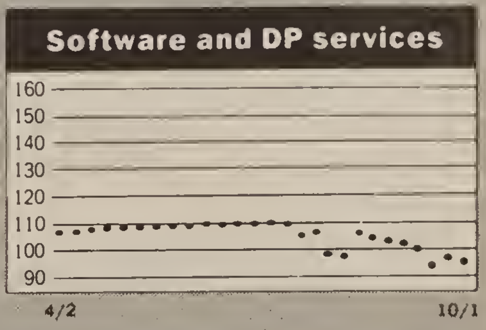
Separately, IBM promoted Michael J. Attardo from director of development to vice-president of development. He is responsible for IBM's worldwide technology and development activities.

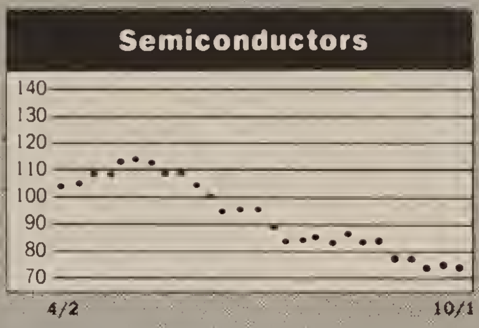
MITCHELL J. HAYES

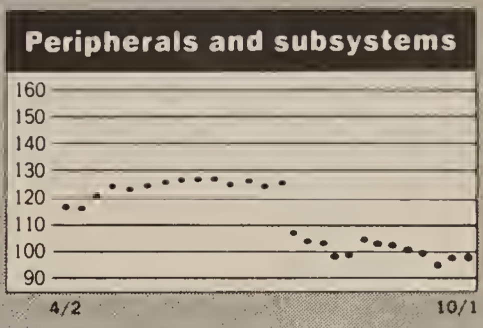
Computerworld stock trading index

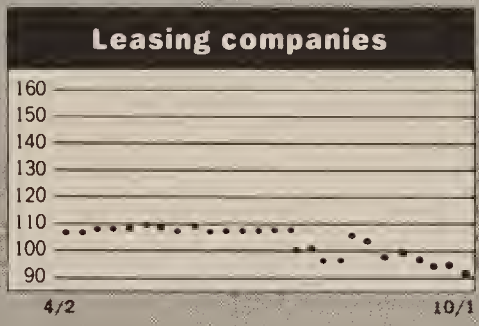


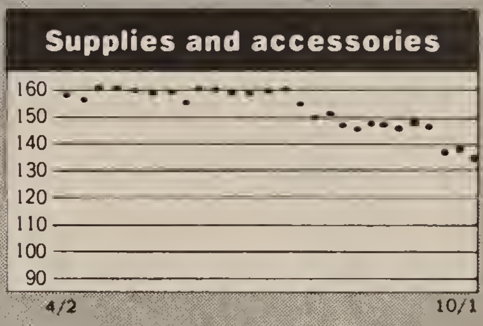












All indexes reflect a historical base of 100 on Dec. 31, 1984, and trace stock market performance in relation to that base. The CW stock index represents the unweighted average performance of the six categories of computer industry stocks.

	9/24/86	10/1/86
Computer systems	108.5	**107.2**
Software and DP services	94.0	**93.2**
Peripherals and subsystems	96.6	**96.9**
Supplies and accessories	134.2	**131.5**
Semiconductors	74.4	**73.1**
Leasing companies	93.7	**90.8**
CW stock index	111.5	**111.2**
Standard and Poor's 500 stock index	141.3	**139.7**

Computerworld stock trading summary

CLOSING PRICES WEDNESDAY, OCTOBER 1, 1986

COMPUTER SYSTEMS

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE OCT 1 1986	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	8	4	6.63	+0.1	+1.9
O	ALTDS COMPUTER SYS	19	10	11.00	-0.1	-1.1
A	AMOAHL CORP	22	10	20.50	-0.6	-3.0
O	APOLLO COMPUTER INC	18	9	13.88	+1.4	+11.0
O	APPLE COMPUTER INC	39	15	34.13	-1.0	-2.8
N	AT&T	26	20	22.75	-0.8	-3.2
N	8URROUGHS CORP	76	52	69.63	-0.5	-0.7
O	C P T CORP	7	4	3.75	-0.1	-3.2
N	CDMPAQ COMPUTER CORP	18	8	15.38	-0.4	-2.4
A	COMPUTER CONSOLES INC	12	6	7.63	+0.1	+1.7
O	CONCURRENT COMP CORP	25	1	14.00	+0.0	+0.0
N	CONTROL OATA CORP OEL	29	16	26.75	+0.4	+1.4
O	CONVERGENT TECH	14	6	5.75	-0.1	-2.1
N	CRAY RESH INC	100	46	78.00	-3.8	-4.6
O	DAISY SYS CORP	32	8	8.50	-0.1	-1.4
N	DATA GEN CORP	50	27	29.00	-2.3	-7.2
N	OATAPOINT CORP	9	5	7.38	-0.3	-3.3
N	OIGITAL EQUIP CORP	105	51	89.88	-3.3	-3.5
N	ELECTRONIC ASSOC INC	7	4	4.25	-0.4	-8.1
N	FLDATING POINT SYS INC	46	12	12.63	-0.6	-4.7
N	GOULD INC	38	15	20.38	+2.3	+12.4
N	HARRIS CORP OEL	36	22	28.88	-0.5	-1.7
N	HEWLETT PACKARO CO	50	29	38.88	-4.6	-10.6
N	HONEYWELL INC	87	59	71.63	+1.1	+1.6
N	IBM	162	123	133.00	-4.5	-3.3
O	IPL SYS INC	4	1	2.25	-0.3	-10.0
N	ITT CORP	60	33	49.13	-0.3	-0.5
N	M A COM INC	19	13	13.75	-1.4	-9.1
N	MATSUSHITA ELEC INOL LTO	118	51	113.50	+5.3	+4.8
O	MENTOR GRAPHICS CORP	21	11	14.25	+0.6	+4.6
N	MOHAWK OATA SCI CORP	4	1	2.75	+0.4	+15.8
N	NBI INC	14	9	8.88	-0.4	-4.1
N	NCR CORP	57	32	48.13	+0.3	+0.5
N	PRIME COMPUTER INC	28	15	18.75	-2.0	-9.6
N	SPERRY CORP	77	46	75.75	+0.0	+0.0
O	STRATUS COMPUTER	26	15	21.75	-1.5	-6.5
O	SYM8OLICS INC	16	5	5.50	+0.8	+15.8
O	TANOEM COMPUTERS INC	40	13	33.50	-1.4	-3.9
N	TANOY CORP	45	31	32.25	+0.6	+2.0
N	TEXAS INSTRS INC	148	88	109.00	-4.5	-4.0
A	ULTIMATE CORP	35	11	15.75	-1.1	-6.7
A	WANG LA8S INC - 8	23	12	12.88	+0.0	+0.0
A	WANG LABS INC - C	23	11	13.00	+0.0	+0.0
N	XEROX CORP	72	46	52.00	-2.6	-4.8

SUPPLIES & ACCESSORIES

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE OCT 1 1986	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMER 8USINESS PROOS	37	25	25.50	-0.4	-1.4
N	8ARRY WRIGHT CORP	25	16	16.38	-0.4	-2.2
A	OUPLEX PROOS INC	23	17	19.38	-1.1	-5.5
N	ENNIS 8USINESS FORMS INC	28	15	22.88	-0.9	-3.7
N	3M CO	116	75	101.50	-1.9	-1.8
N	MOORE LTO	28	18	21.50	+0.4	+1.8
O	STANDARO REGISTER CO	50	33	33.75	+0.0	+0.0
N	WALLACE COMPUTER SVCS	50	33	39.13	-1.5	-3.7

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; 8=8OSTON;
L=NATIONAL; M=MIOWEST; O=OVER-THE-COUNTER; S=SPLIT

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SOFTWARE & DP SERVICES

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE OCT 1 1986	WEEK NET CHNGE	WEEK PCT CHNGE
O	AOVANCED COMP TECH	7	3	4.69	-0.3	-6.2
N	ADVANCEO SYS INC	20	12	13.25	-0.8	-5.4
N	AGS COMPUTERS INC	25	14	18.25	+D.B	+4.3
O	AMERICAN MGMT SYS INC	20	9	15.25	+0.3	+1.7
O	AMERICAN SOFTWARE INC	15	9	12.88	+0.4	+3.0
N	ANACOMP INC	7	3	3.75	+0.1	+3.4
O	ANALYSTS INTL CORP	10	4	4.00	+0.0	+0.0
D	ASHTON TATE	34	10	29.75	+0.6	+2.1
O	ASK COMPUTER SYS INC	15	7	10.63	+0.0	+0.0
O	ASTRAOYNE COMP INO	3	1	2.13	+0.0	+0.0
N	AUTOMATIC OATA PROC	39	24	32.50	-1.3	-3.7
O	COMPUTER ASSOC INTL INC	25	10	22.75	+0.0	+0.0
O	COMPUTER HORIZONS CORP	15	10	11.00	+0.8	+7.3
O	COMPUTER NETWORK TECH	10	2	5.06	-0.5	-9.0
N	COMPUTER SCIENCES CORP	40	23	31.25	+0.1	+0.4
O	COMPUTER TASK GROUP INC	19	11	14.88	+2.0	+15.5
O	COMPUTONE SYS INC	6	1	0.88	+0.0	+0.0
O	COMSHARE INC	16	9	12.50	+0.0	+0.0
N	CULLINET SOFTWARE INC	20	6	6.88	-0.4	-5.2
O	CYCARE SYS INC	17	10	10.38	-0.4	-3.5
O	DUQUESNE SYS INC	33	11	29.50	+1.0	+3.5
N	GENERAL ELEC CO	83	56	72.75	-0.8	-1.0
N	GENERAL MTRS CORP	50	33	34.63	-0.1	-0.4
N	GTE CORP	60	39	53.50	-1.4	-2.5
O	HOGAN SYS INC	12	5	10.25	+0.0	+0.0
O	INFORMATION SCIENCES INC	4	1	1.56	-0.2	-10.7
O	INFOTRDN SYS CORP	19	9	8.75	-0.B	-7.9
D	KEANE INC	16	6	6.25	-0.4	-5.7
N	LOGICON INC	43	24	25.00	-1.3	-4.8
O	LOTUS OEV CORP	42	15	40.25	+2.0	+5.2
O	MANAGEMENT SCI AMER	16	8	12.00	-0.3	-2.0
O	MCI COMM CORP	13	7	7.13	-0.6	-8.1
O	MICOM SYS INC	23	10	10.63	-0.4	-3.4
O	MICRO PRO INTL CORP	4	2	2.25	-0.1	-2.7
O	MICROSOFT CORP	36	26	28.00	-1.6	-5.5
O	NATIONAL OATA CORP	26	13	20.63	+0.5	+2.5
O	ON LINE SOFTWARE INT	16	6	11.50	+0.5	+4.5
O	ORACLE SYS CORP	29	13	14.25	-1.5	-9.5
N	PANSOPHIC SYS INC	36	18	28.50	+0.8	+2.7
N	PLANNING RESH CORP	24	14	20.50	+0.0	+0.0
O	POLICY MGMT SYS CORP	24	15	15.25	-0.8	-4.7
O	PROGRAMMING & SYS INC	11	5	8.75	+0.8	+9.4
O	REYNOLOS & REYNOLDS CD	42	19	33.50	+0.3	+0.8
O	SCIENTIFIC COMPUTERS INC	6	4	4.25	-0.1	-2.9
D	SEI CORP	28	15	16.75	+0.0	+0.0
O	SHAREO MEO SYS CORP	41	29	32.75	+0.0	+0.0
D	SOFTWARE AG SYSTEMS INC	22	13	15.50	-0.8	-4.6
O	SOFTWARE PUBG CORP	10	5	5.00	-0.1	-2.4
A	STERLING SOFTWARE INC	21	7	15.25	+0.0	+D.0
N	UCCEL CORP	24	13	22.50	+0.5	+2.3
N	URS CORP	18	10	15.38	+0.4	+2.5
O	VM SOFTWARE INC	32	17	26.50	-D.5	-1.9

SEMICONDUCTORS

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE OCT 1 1986	WEEK NET CHNGE	WEEK PCT CHNGE
N	AOVANCED MICRO DEV	34	14	15.88	-1.8	-9.9
N	ANALOG OEVICES INC	25	14	16.50	-1.5	-8.3
O	ANALOGIC CORP	16	10	12.50	+0.5	+4.2
N	APPLIED MAGNETICS CORP	20	12	13.63	+0.1	+0.9
O	AVANTEK INC	24	15	16.13	-0.5	-3.0
O	HADCO CORP	7	3	3.88	+0.3	+6.9
O	INTEL CORP	32	16	19.63	-0.4	-1.9
O	MICRO MASK INC	7	2	3.00	+0.1	+4.3
N	MOTOROLA INC	50	29	38.25	-D.6	-1.6
N	NATIONAL SEMICONDUCTOR	16	8	8.75	-0.4	-4.1
N	TERAOYNE INC	30	17	17.25	-1.3	-6.8

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE OCT 1 1986	WEEK NET CHNGE	WEEK PCT CHNGE
A	AM INTL INC	9	3	5.38	-0.3	-4.4
A	ANDERSON JACOBSON INC	3	2	1.88	+0.1	+7.1
O	AST RESH INC	33	11	12.50	+0.1	+1.0
O	AUTOTROL CORP	10	6	6.56	-0.1	-1.9
O	AVANT GAROE COMPUTING	9	3	5.13	+0.9	+20.6
O	BANCTEC INC	13	6	7.50	+0.0	+0.0
N	8OLT BERANEK & NEWMAN	48	29	42.75	+1.6	+4.0
N	CENTRONICS OATA COMP	8	4	7.25	-0.3	-3.3
A	CETEC CORP	9	6	5.81	-0.1	-1.1
A	COGNITRONICS CORP	6	3	2.88	-0.1	-4.2
N	COMPUGRAPHIC CORP	29	16	22.13	-0.9	-3.8
N	COMPUTERVISION CORP	19	9	13.13	-0.1	-0.9
N	CONRAC CORP	18	11	14.25	-0.5	-3.4
A	OATAPRODUCTS CORP	18	11	13.50	+0.0	+0.0
A	OATARAM CORP	18	6	8.25	+0.1	+1.5
O	OATA SWITCH CORP	9	5	5.75	-0.1	-2.1
O	DATUM INC	7	5	4.75	+0.1	+2.7
N	OECISION INDS CORP	15	8	8.25	+0.1	+1.5
O	ENDATA INC	8	3	6.D0	-0.1	-2.0
O	EVANS & SUTHERLANO	27	17	21.00	-0.6	-2.9
N	FLOATING PDINT SYS INC	46	12	12.63	-0.6	-4.7
O	GANDALF TECHNOLOGIES	8	5	5.38	+D.0	+0.0
N	GENERAL DATACOMM INO	15	8	8.50	-0.4	-4.2
N	HAZELTINE CORP	27	16	20.75	+1.3	+6.4
O	ICOT CORP	13	6	9.00	-0.1	-1.4
O	INFORMATION INTL INC	18	10	14.00	+0.0	+0.0
O	INTECOM INC	7	3	5.31	+0.0	+0.0
O	INTERLEAF INC	15	8	8.75	+0.8	+9.4
O	MEGADATA CORP	5	2	2.38	+0.1	+5.6
A	MSI DATA CORP	14	8	12.25	+2.0	+19.5
N	NASHUA CORP	28	12	22.88	+1.0	+4.6
O	NETWORK SYS CORP	25	10	13.75	+0.3	+1.9
N	NORTH AMERN PHILIPS CORP	48	32	38.75	+0.0	+0.0
N	NORTHERN TELECOM LTO	38	25	27.88	-0.1	-0.4
O	NOVELL INC	24	11	20.75	-0.8	-3.5
O	OMEX	1	0	0.38	+0.0	+0.0
N	PARADYNE CDRP	11	5	5.50	+0.0	+0.0
A	PENRIL CORP	9	5	5.38	+0.4	+7.5
N	PLESSEY PLC	38	19	25.50	+0.0	+0.0
O	PRINTRONIX INC	15	11	11.88	-0.4	-3.1
O	QMS INC	16	6	11.75	-0.1	-1.1
O	RAMTEK CORP	7	2	4.63	-0.9	-15.9
N	RECDGNITION EQUIP INC	17	9	12.50	-0.6	-4.8
N	SANDERS ASSOC INC	63	29	59.88	+0.0	+0.0
O	SCAN TRON CORP	19	10	15.25	-2.0	-11.6
N	SCIENTIFIC ATLANTA INC	15	9	9.00	+0.1	+1.4
O	SEAGATE TECHNOLOGY	17	5	16.00	+1.1	+7.6
N	STORAGE TECHNOLOGY	7	1	2.25	+D.0	+0.0
O	SUN MICROSYSTEM INC	20	11	14.50	+1.5	+11.5
A	T-8AR INC	7	5	5.13	+0.0	+0.0
A	TA8 PROOS CO	15	10	13.75	+0.3	+1.9
O	TANDON CORP	8	2	2.50	-0.1	-4.8
A	TEC INC	8	4	4.75	+D.0	+0.0
N	TEKTRDNIX INC	65	47	61.13	+0.8	+1.2
O	TELEVIDEO SYS INC	4	2	2.75	-0.1	-4.3
N	TELEX CORP	69	42	58.75	-1.8	-2.9
N	TIMEPLEX INC	24	14	14.75	-0.4	-2.5
N	TITAN CORP	12	5	7.88	+0.5	+6.8
O	VISUAL TECHNOLOGY INC	1	0	0.63	-0.1	-9.2
O	WYSE TECH	19	7	14.00	-0.3	-1.8

LEASING COMPANIES

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE OCT 1 1986	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMOISCO INC	25	12	16.00	-1.4	-7.9
N	CONTINENTAL INFD SYS	12	5	8.88	-0.3	-2.7
O	FINALCO GRDUP INC	5	3	3.25	+0.0	+0.0
O	PHOENIX AMERN INC	6	2	3.56	-0.1	-1.7
O	SELECTERM INC	12	5	6.00	-0.5	-7.7
N	U.S. LEASING	46	32	42.63	+0.5	+1.2

COMPUTER INDUSTRY

INSIDE

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INSTANT ANALYSIS

"Vendors' confidence in improving conditions seems to be reflected in higher orders for peripherals, controllers and components of systems."

— John P. Rohal, Alex Brown & Sons, Inc.

Contel and Comsat become partners in $2.5 billion deal

By James A. Martin

ATLANTA — Last week's announced merger between Washington, D.C.-based Communications Satellite Corp. (Comsat) and Atlanta-based Contel Corp. has stirred some debate about highly profitable Contel's move into the sluggish satellite communications market.

The merger is expected to be challenged by at least one telecommunications vendor, MCI Communications Corp., as unfair competition.

Under the agreement, Comsat will retain its name and identity. Even though Contel will become a subsidiary of Comsat, control of the company will be transferred to Contel executives.

Contel, with fiscal 1985 sales of $2.5 billion and profits of $240 million, will become a subsidiary of Comsat, which had 1985 sales of $459 million and a loss of $41.5 million after an $84 million write-down from the sale of its stake in Satellite Business Systems. The agreement calls for an exchange of stock valued at $2.5 billion.

Contel, formerly Continental Telecom, Inc., operates local telephone companies in 30 states and manufactures data communications products such as its Contelnet local-area network. Comsat was designated in 1962 as the U.S. representative to the International Telecommunications Satellite Organization (Intelsat), a consortium of countries that provides international telecommunications services via satellite. The companies are keeping the Comsat name to retain the firm's official affili-

See **CONTEL** page 160

ADR names Strigl president

By Alan Alper

PRINCETON, N.J. — Applied Data Research, Inc. (ADR), dipping into the executive ranks of a sister Ameritech company, last week named Dennis F. Strigl as president and chief operating officer. Strigl succeeds cofounder Martin A. Goetz, who takes on the new position of senior vice-president and chief technology officer.

ADR's Strigl

Strigl, 40, joins the IBM mainframe software vendor from Ameritech Mobile Communications, where he was president. Ameritech, the Chicago-based regional telecommunications holding company created by the breakup of AT&T, acquired ADR for $215 million in cash earlier this year.

Goetz said it was his decision to assume the chief technology officer position. After spending two years as chief operating officer, Goetz said, he longed to return to his research and development roots.

"I found myself spending less and less time looking at technology and more and more time pushing paper," Goetz said. "The move will allow me to spend more time on the long-term strategic direction of the company."

ADR Chairman and Chief Executive Officer John Bennett said when Goetz asked to concentrate more on technology, he went to Ameritech President Jim Howard looking for presidential candidates. "We felt the best thing to do was to get someone with chief operating officer experience and get talent from outside the organization," Bennett said.

It was Howard, Bennett said, who suggested Strigl to succeed Goetz. Strigl's nomination was then approved by ADR's board, which consists of five directors from Ameritech and four from ADR.

See **ADR** page 161

INDUSTRY INSIGHT
Clinton Wilder

Panic grips chip buyers

There is fear and loathing in the industry these days. It is in the increasingly panicky and bitter battle between U.S. companies that make computer chips and U.S. systems vendors that purchase them.

In attempting to bury the hatchet with Japanese chip makers via the much-heralded trade semiconductor trade agreement, the U.S. government has succeeded in driving a wedge between domestic chip makers and chip users that may prove very hard to remove.

If politics makes strange bedfellows, the vagaries of world economics can group an even more disparate lot into that proverbial bed.

For at least two years, the more outspoken members of the U.S. semiconductor industry have railed against the government, begging for action against Japanese predatory pricing that they claimed was ruining the U.S. memory chip market when U.S. vendors could least afford it.

The government finally acquiesced; now it is computer makers, some under the auspices of the American Electronics Association, no less, who are crying foul.

In the past, the beleaguered American semiconductor industry has complained that chip prices, particularly those of memory chips, have been artificially low. Since the U.S.-Japan trade agreement, buyers of those chips

See **PANIC** page 161

Wilder is Computerworld's *senior editor, computer industry.*

Wang teams up with Sun, Apollo in systems market

By Rosemary Hamilton

LOWELL, Mass. — Wang Laboratories, Inc. signed agreements last week with engineering workstation archrivals Apollo Computer, Inc. and Sun Microsystems, Inc. to offer integrated systems to the technical office and engineering markets.

Wang said it plans to offer software that would link its VS systems to the Sun and Apollo workstations, although no product has yet been announced.

The separate agreements are identical, a Wang spokesman said. The vendors will cooperate by providing sales leads, and then each will be responsible for selling its own equipment. Wang will be responsible for the integration products.

"Wang will open the doors for both of us, and then we can go in and compete," said Joe Roebuck, vice-president of sales at Sun.

In order to alleviate conflicts that may arise from working with both Apollo and Sun, Wang said, it will not be involved in workstation purchasing decisions. "Wang will take the position that the customers make the workstation choice," said Paz Kahana, Wang's senior marketing manager for desktop systems.

The agreements provide Wang with the opportunity to sell its office automation systems to technical professionals, a customer base with which it does not have a strong identity. The workstation vendors, in turn, are expecting access to the corporate market, in which they do not

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On-Line could buy UFO, Ramis II and Unison from Martin Marietta

By Charles Babcock

FORT LEE, N.J. — On-Line Software International, Inc. said last week it is negotiating with Martin Marietta Data Systems, Inc. to purchase two key mainframe software product lines — the Ramis II information center system and UFO, an application generation system.

Jack Berdy, chairman of On-Line Software, said he hopes a deal can be concluded within two weeks. UFO, with an installed base of 2,000, and Ramis II, with an installed base of 1,200, would double the size of On-Line Software.

Also included in the talks is Martin Marietta's Unison line of products, which consists of programs providing gateways to the mainframe and application development languages.

According to Berdy, On-Line Software is also interested in acquiring certain business assets from Martin Marietta. These assets include a direct sales force with regional offices, he said.

On-Line Software is a telemarketing firm that does not now use a direct sales force. It has specialized in IBM CICS system products including Intertest, Omniguard and Verify.

Berdy said On-Line Software's own 1-year-old on-line query and reporting system, Executrieve, has not been "a high priority" product. In looking at competing products, he concluded "Ramis II is probably the best one out there" and that it already has a large installed base.

Berdy also noted that 40% of Martin Marietta's software sales are in Europe, where On-Line Software is weak.

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